RECORD OF DECISION

CHEROKEE COUNTY SITE
OPERABLE UNIT 08 -
RAILROADS

CHEROKEE COUNTY, KANSAS

Prepared by:

U. S. Environmental Protection Agency
Region 7
11201 Renner Blvd
Lenexa, Kansas 66219

September 2016

Table of Contents

Appendices

RECORD OF DECISION
DECLARATION

SITE NAME AND LOCATION
Railroads, Operable Unit 08 (OU 08)
Cherokee County Superfund site
Cherokee County, Kansas

STATEMENT OF BASIS AND PURPOSE
This decision document presents the Selected Remedy for the Railroads (CCR OU 08) of the Cherokee County Superfund site, Cherokee County, Kansas. This decision document was developed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record for the Site. This Record of Decision, and all documents relied upon to make the decision, are incorporated into an Administrative Record for the Site. The Administrative Record is available for public review online at:

https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.ars&id=0700667 and at the EPA Region 7 office at the following address:

U.S. Environmental Protection Agency
Region 7 Records Center
11201 Renner Blvd
Lenexa, Kansas 66219

The State of Kansas concurs with the Selected Remedy.

ASSESSMENT OF THE SITE
The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY
The U.S. Environmental Protection Agency believes the Selected Remedy for Cherokee County Railroads (CCR) OU 08, Alternative 3 - Source Removal with Consolidation and Capping at OU3/OU4 Consolidation Areas, with an estimated present worth cost of $16 million, appropriately addresses the principal current and potential risks to the environment. This ROD addresses the inactive rail lines within the Cherokee County site. This Selected Remedy addresses ecological risks by the remediation of surficial mine waste and soil contaminated with metals from past mining activities at the Site. In addition to CCR OU 08, the Site also includes eight other OUs. RODs were declared and signed for OUs 01, 03, 04, 05, 06, and 07. OUs 01, 05, 06, and 07 have completed their remedial actions and are in, or in the process of transitioning to, the operations and maintenance (O&M) phase. OUs 03 and 04 have ongoing remedial actions. OUs 02 and 09 are in the remedy characterization phase.

This remedy includes the removal of contaminated material above and below grade and backfilling the excavation with clean soil. Railroad ballast material visually identified as chat would be removed and then the underlying area would be screened using x-ray fluorescence (XRF) to verify that metals

concentrations in the remaining soil are at or below cleanup levels. Excavation and removal of the underlying soil would continue until these criteria are met. Railroad ballast material and contaminated soil would be consolidated at one or more waste consolidation areas constructed as part of the OU 03/04 Phase 2/3 RAs. The consolidation would not significantly enlarge the OU 03/04 consolidations areas, and the removal of materials from the CCR OU 08 areas will increase other areas in the county suitable for agricultural or other non-residential use. The site-wide IC program would include the CCR OU 08 removal areas to monitor for disturbance and in reference to changes in use of the properties.

Based on survival of vermivore receptors, the cleanup levels for mine waste and contaminated soils in the CCR OU 08 rail lines to protect the ecological receptors are:

- Lead - 1,770 parts per million (ppm)
- Zinc - 4,000 ppm

DECLARATION OF STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. The remedy for this OU does not satisfy the statutory preference for treatment as a principal element of the remedy for the following reasons: material type, large volume and potentially expensive methods to stabilize or treat the mine waste, and the effectiveness of nontreatment alternatives. Because this remedy will result in hazardous substances, pollutants, or contaminants remaining above levels that allow for unlimited use and unrestricted exposure, a Five-Year Review will be required for this remedial action.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary of this ROD:

- Chemicals of concern and their respective concentrations (pg.4).
- Baseline risk represented by the chemicals of concern (pg.7).
- Cleanup levels established for chemicals of concern and the basis for these levels (pg.9).
- How source materials constituting principal threats are addressed (pg.17).
- Current and reasonably anticipated future land use assumptions (pg.8).
- Potential land use that will be available at the Site as a result of the Selected Remedy (pg. 17).
- Estimated capital; annual operation and maintenance; and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (pg. 18).
- Key factors that led to selecting the remedy (pg.17).

Mary P. Peterson

Mary P. Peterson, Director
Superfund Division
U.S. EPA, Region 7

9/23/2016
Date

Record of Decision – Decision Summary

Railroads – Operable Unit 08
Cherokee County Superfund Site
Cherokee County, Kansas

SITE NAME, LOCATION, AND DESCRIPTION

This ROD for the Cherokee County site (Site), CCR OU 08, concerns an upcoming remedial action (RA) to address heavy metals surface soil contamination at inactive rail lines across the Site. It provides background information, summarizes recent information driving the Selected Remedy, identifies the Selected Remedy for cleanup and its rationale, and summarizes public review and comment on the Selected Remedy.

This ROD is a document that the U.S. Environmental Protection Agency as lead agency for the Site is required to issue to fulfill the statutory and regulatory requirements found in Section 117(a) of the Comprehensive Environmental, Response, Compensation and Liability Act (CERCLA) of 1980, as amended, 42 U.S.C. § 9617, commonly known as Superfund, and Section 300.430(f)(4) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The support agency is the Kansas Department of Health and Environment (KDHE). The EPA plans to conduct the RA as federal fund-lead work.

The Site is located in Cherokee County, Kansas, the most southeastern county of the state of Kansas, and represents the Kansas portion of the former Tri-State Mining District (TSMD). (Refer to Figure 1 for a map showing the location of the Site.) The National Superfund Database Identification Number for the Site is KSD980741862. Cherokee County encompasses 591 square miles. The county is bordered by Crawford County on the north, by Newton and Jasper Counties in Missouri on the east, by Labette County on the west and by Ottawa and Craig Counties in Oklahoma on the south. The Site encompasses 115 square miles of southeast Cherokee County. The communities of Baxter Springs, Columbus, Galena and Riverton are located within the Site boundaries. Land use is predominantly agricultural interspersed with light industrial and residential areas. The Site is arranged into nine OUs for administrative efficiency in conducting environmental cleanups: OU 01, Galena Alternate Water Supply; OU 02, Spring River Basin; OU 03, Baxter Springs subsite; OU 04, Treece subsite; OU 05, Galena Groundwater/Surface Water; OU 06, Badger, Lawton, Waco, and Crestline subsites; OU 07, Galena Residential Soils; OU 08, Railroads; and OU 09 Tar Creek Watershed. CCR OU 08 consists of the inactive rail lines within the site boundaries and not previously addressed under other actions (Figure 2). The total length of the rail lines in the CCR OU 08 is approximately 206,745 feet, or 39 miles.

Contaminated media at the CCR OU 08 include railroad ballast (mine wastes), soils, groundwater, sediments, and surface water. The contaminants of concern (COCs) are lead and zinc. The contamination was caused by lead and zinc ore mining and processing that began in Kansas in the 1870s and continued until 1970. The mining and processing generated chat piles and tailings that are the sources of the COCs.

This ROD, and all documents relied upon to make the decision, is incorporated into an Administrative Record (AR) for the Site. The AR is available for public review online at:

https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.ars&id=0700667 and at the EPA Region 7 office at the following address:

U.S. Environmental Protection Agency
Region 7 Records Center
11201 Renner Blvd
Lenexa, Kansas 66219
Phone: (913) 551-7939
Hours: Monday - Friday, 8:00 am to 5:00 pm (by appointment only)

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Activities leading to current problems: Lead and zinc mining began in the middle 1800s and continued for over a century in the TSMD; the final mining activities ceased in 1970. Sphalerite (zinc sulfide) and galena (lead sulfide) were the principle mined ores, and several other metal sulfides were found in association with the economic ores. The mining activities changed the hydrology of the area by creating a labyrinth of underground voids and many open conduits. These features facilitate surface subsidence and collapse as well as enhanced flow of mineralized groundwater in the subsurface. Surficial mining wastes also leach metals into the groundwater system and surface water bodies and sediments. The normal surface and subsurface flow characteristics have been modified by past mining activities; and since much of the surface vegetation is impacted or absent, there is increased infiltration of surface water into the shallow groundwater system and erosion of mining wastes into surface water bodies. During the active mining years, water was continually pumped out of the mines because the ore was predominantly located in the saturated zone of the same bedrock formations that contain the area's shallow aquifer. When mining ceased, the mines refilled with water as a result of natural groundwater recharge and surface water inflow through mine shafts and subsidence areas. The upper aquifer is now contaminated with metals and is acidic in some areas. Acid mine drainage is prevalent throughout many areas of the TSMD. Additionally, past practices at the Site have resulted in chat being distributed to residential yards as fill or driveway material. Lead and zinc are found in mine wastes, including chat, and soils at maximum concentrations of several thousand parts per million (ppm).

CCR OU 08 comprises the portions of the rail lines within the Cherokee County Site that were not addressed under other OUs. During the years the mines operated, railroads were constructed in Cherokee County to join conventional large-scale railroads to the individual mining operations. Figure 2 illustrates the current and former rail line locations through the County. The ballast material used in the railroad beds was composed of chat from surrounding mine waste piles. Traditionally, these historical railroads were abandoned in place when mining operations ceased at each mine. Currently, the historical rail lines that cross through private property vary in condition: some show little deterioration from their original condition, while others have degraded to the point they are unidentifiable as former rail lines. Depending on the current use of the area, some former rail lines exhibit extensive vegetative regrowth with a thick organic layer, while others have been incorporated into the surrounding area. Some historical rail lines have been investigated and remediated under CERCLA within other OUs if encountered immediately near mine waste areas. At some locations, some of the ballast may have been completely removed in areas along the rail lines as a result of construction activities, such as highway cuts.

Recently, many rail lines were abandoned by railroad companies and reverted back to the property owner through the Surface Transportation Board. Regional plans existed to convert some historic rail beds to the national Rails to Trails program. This conversion program began in the Missouri part of the

region with potential expansion into Kansas. This potential change in land use prompted the EPA to address the change in exposure scenarios, to be evaluated in the HHRA and in the ERA.

Federal, state, and local site investigations; removal and remedial actions: The EPA placed the Site on the National Priorities List (NPL), set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on September 8, 1983, 48 Fed. Reg. 40658. Subsequent to the NPL listing, the EPA has conducted a number of investigations throughout the Site, beginning in the Galena subsites in 1985. Numerous remedial and removal actions have taken place throughout the Site as noted in RODs and Five-Year Reviews for the various OUs. The EPA identified and designated CCR OU 08 in 2012. Investigation of CCR OU 08 has consisted of the remedial investigation (RI) that began in 2013. Sampling was conducted in 2013 during three separate events. Following completion of the RI, the feasibility study (FS) began in 2015. A Streamlined Ecological Risk Assessment (ERA) was conducted in-house in 2014 while the Baseline Human Health Risk Assessment (HHRA) was completed in 2015. The RI/FS of CCR OU 08 is the first investigation of rail lines that is not associated with investigations at areas identified as mining sites and characterized as part of another OU.

History of CERCLA enforcement activities: Property access was obtained through access agreements signed by either the property owner (for abandoned segments that reverted to private ownership) or from BNSF (for segments retained by the company). Access for BNSF-owned rail lines was coordinated through their contractor at Jones Lang LaSalle America, Inc., and was approved in October, 2013. Following signature of this ROD, a potentially responsible party (PRP) search will begin.

COMMUNITY PARTICIPATION

The public was encouraged to participate in the Proposed Plan and ROD process in development of this ROD. The Proposed Plan highlighted key information from the RI Report, FS Report, HHRA, ERA, and other supporting documents in the AR. Additionally, the public has been made aware of the environmental issues in the county through fact sheets, public availability sessions and press releases during the previous removal and remedial cleanups that have occurred and continue at the Site. To provide the community with an opportunity to submit written or oral comments on the Proposed Plan for CCR OU 08, the EPA established a 30-day public comment period from August 13 to September 13, 2016. The notice of the public comment period and availability of the AR file was published in the Joplin Globe on July 30, 2016.

A public meeting was held on August 15, 2016, at 6:30 p.m. at the Baxter Springs Community Center in Baxter Springs, Kansas, to present the Proposed Plan, accept written and oral comments, and answer any questions concerning the proposed cleanup. A total of 18 people were in attendance including local residents and state and federal government officials. A transcript of the public meeting has been included in the AR. A summary of the oral comments and questions received at the public meeting and the responses are provided in the attached Responsiveness Summary. The Responsiveness Summary also contains a summary of correspondence received during the public comment period and the EPA's responses to these comments.

SCOPE AND ROLE OF OPERABLE UNIT

The subject of this ROD for CCR OU 08 addresses solely the mine waste and contaminated soil of the inactive rail lines. The Selected Remedy for this final ROD presents the EPA's approach to address the remedial actions for CCR OU 08. This ROD presents the final response action for this OU. As with

many Superfund sites, the problems at the Cherokee County site are complex. As a result, the EPA has organized the work into nine OUs:

- OU 01, Galena Alternate Water Supply;
- OU 02, Spring River Basin;
- OU 03, Baxter Springs subsite;
- OU 04, Treece subsite;
- OU 05, Galena Groundwater/Surface Water;
- OU 06, Badger, Lawton, Waco, and Crestline subsites;
- OU 07, Galena Residential Soils;
- OU 08, Railroads; and
- OU 09 Tar Creek Watershed

Ecological receptors are exposed to heavy metals primarily by ingestion of mine waste, soils, sediments, surface water, groundwater, vegetation, and prey as well as inhalation of toxic dusts. However, sediment contamination does not appear to be attributable to the rail line. Sediment and surface water are being addressed under separate OUs. And the shallow groundwater is covered under a technical impracticability (TI) waiver under the OU 03 and 04 ROD. Ingestion and inhalation of heavy metals present in the mine waste and contaminated soil associated with the inactive rail lines pose a current and potential risk to ecological receptors. CCR OU 08-specific cleanup levels were developed based on the short-term exposure that ecological receptors have to the limited areal extent of the inactive rail lines. The cleanup levels are meant to represent concentrations above which animals may exhibit impaired health from exposure to metals.

SITE CHARACTERISITICS

Conceptual Site Model: Analytical data from the RI and previous Site investigations indicate that lead and zinc are present in the chat supplied as railroad ballast that is associated with historical mining activities in Cherokee County. A total of approximately 39 miles of inactive lines are within the Cherokee County site. A range of average width for the inactive lines is 10.8 feet to 21.5 feet. Average thickness ranged from 1.6 feet to 3.5 feet, see Figures 4 through 9. The primary transport mechanism for metals contamination in CCR OU 08 was the use of mining chat as ballast on the rail beds. Secondary transportation of contamination to and from the rail beds would be from leaching into native soil underlying the chat, airborne dust, and surface water runoff. It is evident that the elevated concentrations of metals are derived from the chat and other mining wastes as compared to the previously established soil cleanup levels at the Site. This is supported by analytical data indicating that elevated metals concentrations generally decreased significantly in samples of native soils versus the overlying weathered chat.

The near-surface soils present in Cherokee County include many silts and clays, which also underlie the weathered chat. Organic materials in the silts and the fine-grained nature of the clays make it likely that metals weathering and leaching from the chat would bind tightly to the soil particles and become immobile in the environment. Lead and zinc have a tendency to adsorb to soils and their mobility is highly limited, especially in the case of fine-grained soils and/or soils with high content of organic matter. Soils and sediments can become sinks for heavy metals. Metals generally have low water solubility, resulting in limited ability to dissolve in surface water or groundwater under ambient conditions. They also tend to partition out of the aqueous phase onto organic matter or fine-grained soil

particles. These properties combined with their natural corrosion resistance lead to their being immobile and persistent in the environment. Sorption and precipitation to soil particles, metal oxides, and organic matter are the primary means of entrainment of metals contamination in the environment. The dust and runoff could originate from the now-contaminated rail beds onto the surrounding area, or to the area of the rail beds from mine wastes situated nearby the former rail lines. For more detail on the conceptual site model, see Figure 3.

Size of Site/Geographical and Topographical Information: The Site covers the southeast portion of Cherokee County, approximately 115 square miles, in southeast Kansas (Figure 1). CCR OU 08 covers approximately 39 miles of inactive rail lines within the Site (Figure 2). The topography in southeast Kansas is generally gently sloping, except in the river valleys and areas of waste stockpiles and collapsed mine areas. Topographic relief in the stockpile areas within the Cherokee County Site approaches over 50 feet. Topographic relief associated with existing mine shafts and collapse features is on the order of 50 to 100 feet. Side slopes along the collapse features are generally very steep. The site topography along the railroad lines follows the regional topography.

Surface and Subsurface Features: Cherokee County occupies parts of two physiographic provinces defined by Fenneman (1946). Most of the county is in the Osage Plains section of the Central Lowland province, which comprises the typical rolling prairie of eastern Kansas. Large parts of the county that are underlain by easily erodible shale appear to be nearly flat. The southeastern corner of the county is in the Springfield Plateau section of the Ozark Plateaus Province, which is an upland area dissected by stream channels and karst features. According to *Description of the Surficial Rocks in Cherokee County, Southeastern Kansas* (Seevers, 1975), rocks exposed at the land surface in Cherokee County are mostly limestone and shale of the Mississippian and Pennsylvanian Systems, and silt, clay, sand, and gravel of Quaternary age. The consolidated bedrock dips west/northwest at about 20 feet per mile, and progressively older rocks, therefore, are exposed from west to east. Most of the study area is underlain by the Krebs Formation; however, the formation is absent in the southeastern part of Baxter Springs, where the Mississippian System carbonate rocks can be found at the surface. Unconsolidated deposits of silt, clay, sand, and gravel of Quaternary age fill stream valleys incised into the older rocks.

The subsite is underlain by two aquifers that are separated by a confining unit. The shallow aquifer is comprised of Mississippian limestones which host the lead-zinc deposits that were mined at the subsites. Water quality in the shallow aquifer is generally poor, with some water samples exceeding Maximum Contaminant Levels (MCLs) for arsenic, cadmium, lead, mercury, and nickel. Groundwater from the lower levels of the mine pools tends to be acidic. The shallow aquifer is not used at the subsite for domestic or stock water supplies. The shallow aquifer is classified as Class II as it has potential to be a source of drinking water. The regional groundwater flow direction within the shallow aquifer is downgradient to the northwest. Other than movement downgradient, shallow aquifer groundwater seeps from limestone outcrops to the downstream portions of Willow Creek and Spring River. The deep aquifer occurs in the Lower Ordovician Roubidoux Formation and provides the principal source of water for public, industrial, domestic and stock supplies at the subsites and surrounding areas. The deep aquifer is classified as Class II as it is currently a source of drinking water.

The county is drained by the Neosho and Spring Rivers and their tributaries. Lightning, Cherry, and Fly Creeks are the principal tributaries of the Neosho River in Cherokee County. Cow Creek, Shawnee Creek, Shoal Creek, and Brush Creek are the principal tributaries of the Spring River.

Sampling Strategy: During the RI, rail lines in the Site were classified by the condition of the beds and the surrounding areas, as follows:

- Class 1 lines were beginning to deteriorate and there was no evidence of ties, or they were broken down, and there was some weathering of the rail bed (but the topography of the rail bed was visible).
- Class 2 lines were deteriorated with no ties, and the rail bed is discontinuous, or has been weathered extensively.

The former rail lines also were classified on whether the surrounding area was rural, either agricultural or wooded with little or no human exposure, or residential. A map was assembled showing locations where the classification was confirmed by on-site reconnaissance as well as assumed classifications of rail line segments based on nearby confirmed classifications. Locations for subsequent test pits and sampling were also identified based on the findings of the field reconnaissance.

Test pits were excavated with a backhoe across the rail ballasts at 34 locations identified during the reconnaissance. The 34 test pit sample locations were selected to represent varying rail bed conditions, classification, and geographical locations across the Site. A total of 102 test pits were excavated. At each test pit location, grab samples were collected at 6-inch intervals from the surface to a depth of four feet (48 inches). Depending on the location, one to five test pits were excavated and sampled. The test pit number (e.g., Test Pit 2A) corresponds with the sample location on Figure 2 and Figures 4 through 9. The alphabetic (e.g., A) designation indicates a particular test pit at sample location 2 (in this example). There were 68 primary (center-line of the rail bed) test pits and 34 lateral (perpendicular to the rail bed) test pits. It should be noted that some sample locations did not have lateral test pits, while other locations had multiple lateral test pits.

The 587 surface and subsurface soil samples were screened in the field using a portable Niton™ XRF instrument. The analytical method employed was EPA Method 6200 *Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in Soil and Sediment* (EPA, 2007). The suitability of XRF data for use in decision-making was assessed by submitting confirmation samples and evaluating the correlation of XRF data to fixed-lab data. Confirmation samples were collected from the same homogenized material as the associated field screening sample, packed in 8-ounce jars, labeled, and submitted to the EPA Region 7 laboratory.

Surface soil data refers to the 101 samples collected from the 0- to 6-inch interval and field screened with the XRF. The surface soil samples in all cases consisted primarily of weathered chat material, not native soil. Lead was detected in 99 of the 101 surface soil samples. Field screening concentrations ranged from 13 ppm to 2,271 ppm. The highest concentration was detected in Test Pit 9B (Figure 5). The southwest corner of the site area where sample locations 1 to 8 are situated had 7 of the 11 samples with the highest lead levels (over 1,000 ppm) observed during the sampling effort. In particular, higher surface soil lead contamination was observed in select test pits at locations 3 and 5. Zinc was detected in all 101 surface soil samples screened during the RI event. Field screening concentrations ranged from 55 ppm to 20,467 ppm. The highest concentration was detected in Test Pit 29A (Figure 8). The analytical data does not indicate that there are zinc hotspots in particular segments of the OU 08 rail beds.

Subsurface soil data refers to the 486 samples collected from the 6-inch to 48-inch interval. As previously discussed, the samples were collected for screening in 6-inch increments across the subsurface interval. The subsurface soil samples consisted of weathered chat to a depth of about 30 inches where the material generally transitioned to native soil. Native soil in the 102 test pits was

encountered at depths ranging from 6 inches to below 48 inches below ground surface (target depth). Lead was detected in 419 of the 486 subsurface field screening soil samples at concentrations ranging from 7 ppm to 16,533 ppm. The highest concentration was observed in Test Pit 13C in the 24 to 30-inch interval (Figure 6). In the 31 subsurface samples with the highest lead concentrations (those greater than 1,500 ppm) 9 samples were collected below 30 inches. The highest lead level of 2,013 ppm observed in the deepest sample interval (42 to 48 inches) was observed in Test Pit 29B where chat extended the full depth of the pit (Figure 8). The highest lead detections were generally observed above a depth of 30 inches. Zinc was detected in all 486 field screening subsurface soil samples at concentrations ranging from 18 ppm to 30,050 ppm. The highest concentration was observed in Test Pit 17B in the 12- to 18-inch interval (Figure 6). As with lead, the highest zinc detections were generally observed above a depth of 30 inches.

Type of Contamination: Contamination at the Site includes mostly heavy metals in soil, sediment, surface water, and groundwater resulting from past mining and processing.

Quantity and Volume of Waste: The estimated quantity of mine waste and contaminated soil remaining to be addressed under this ROD is 324,000 cubic yards for approximately 39 miles of inactive rail lines expected to exceed 1,770 ppm lead and 4,000 ppm zinc. These estimates were based on the RI sampling.

Concentrations of Chemicals of Concern (COCs): Tables 1 and 2 present a list of COCs for this ROD. For soil, lead and zinc are identified as the primary COCs with the presence of other metals. Lead concentrations at CCR OU 08 range from 7 ppm to 16,533 ppm. Zinc concentrations at CCR OU 08 ranged from 18 ppm to 30,050 ppm.

RCRA Hazardous Waste: Lead is a D-listed hazardous waste constituent pursuant to the Resource and Conservation Recovery Act (RCRA) as set forth in 40 CFR 261.24. Lead is classified by the EPA as a probable human carcinogen and is a cumulative toxicant, while zinc is not classified as a human carcinogen due to insufficient or inclusive data. In 1980, RCRA was amended by adding Section 3001(b)(3)(A)(ii), known as the Bevill Exclusion, to exclude "solid waste from the extraction, beneficiation, and processing of ores and minerals" from regulation as hazardous waste under Subtitle C of RCRA. This exclusion was intended to exclude from RCRA low toxicity, high volume waste which led to the exclusion of 20 mineral processing wastes at 40 CFR 261.4(b)(7), including slag from primary lead processing.

Location of Contamination and Known or Potential Routes of Migration: It is projected that at least 39 miles of inactive rail lines will require remediation of mine waste and contaminated soils exceeding 1,770 ppm of lead and/or 4,000 ppm of zinc. Mine waste chat remains on as many as 39 miles of inactive rail lines with known or potential routes of migration through wind and water erosion and human transport.

Current and Potential Routes for Human and Environmental Exposure: Ingestion of mine waste and metal-contaminated soil are the primary routes of exposure to COCs by ecological receptors. Inhalation and dermal contact of mine waste and metal-contaminated soil were negligible and were not evaluated. For humans, the health risks to the ingestion, inhalation, and dermal contact exposure pathways were within the EPA's target risk range and below the EPA's health-based guideline for all human receptors. Additional detail on the current and potential routes for human and environmental exposures are discussed in the Summary of Site Risks following the next section.

Lateral and Vertical Extent of Contamination: The lateral and vertical extent of contamination are discussed in the previous sub-section Sampling Strategy on page six.

Likelihood for Migration of COCs: The physical and chemical characteristics of constituents and the environmental media (air, water, soil, and sediment) in which they are present affect the mobility and persistence of the metals. Lead is naturally present in soil. Under most conditions lead reacts with clays, phosphates, sulfates, carbonate hydroxides, and organic matter to reduce its solubility. However, the formation of organic complexes may significantly increase the solubility of lead in soil. Above a pH of 6, most lead is bound in lead carbonate or adsorbed on clay surfaces (ATSDR, 2007).

Metals generally, and lead specifically, have low water solubility, resulting in limited ability to dissolve in surface water or groundwater under ambient conditions. They tend to partition out of the aqueous phase onto organic matter. Accordingly, they exhibit limited leaching potential, and tend to migrate or be adsorbed to soil or sediment particles as described below.

The amount of naturally occurring organic carbon present in a soil affects the adsorption of organic compounds in that soil. The greater the organic carbon content in the soil, the more likely it is that the organic compounds migrating through the soil will become adsorbed by the organic component of the soil.

Metals may associate with soil or sediment particles through a number of processes, such as chelation with organic matter, adsorption onto a mineral surface, and precipitation. The occurrence of these processes depends on the valence state of the metal, which in turn is affected by pH and oxidation-reduction potential. In general, metals tend to be less mobile under oxidizing conditions than reducing conditions. The general insolubility in water and tendency to adsorb to soil and organic particles suggest that metals are not influenced by functions such as advection, dispersion, hydrolysis, and others that typically play a major role in the fate and transport of organic compounds. Metals, therefore, tend to be immobile and persistent in the environment.

Human and Other Populations that could be Affected: The populations that could be affected are discussed in the Summary of Site Risks following the next section.

CURRENT AND POTENTIAL FUTURE LAND AND WATER USES

Land use throughout the Cherokee County Site OUs is approximately 60 to 70 percent agricultural - both row crops and pasture land (Dames and Moore, 1993). Rural light industry and commercial facilities are scattered throughout the Site, but clustered primarily around the largest community of Baxter Springs. The 1993 RI Report for OU 03 and OU 04 provides additional details of site-wide land use (Dames & Moore, 1993).

The rail lines include sections of active railroad traffic and lines that are no longer in service in various stages of disrepair. Some inactive sections are privately owned and are situated in rural or residential settings and used as access roads. The current surrounding land use is anticipated to continue to be mostly agricultural and pasture land. Following completion of the Selected Remedy, it is anticipated that the inactive rail lines will continue to act as vegetated or graveled access roads or revert to the surrounding agricultural or pasture land use.

SUMMARY OF SITE RISKS

A HHRA and a streamlined ERA were prepared for CCR OU 08 to determine whether contaminant exposure posed unacceptable risks to recreational users, construction workers, and wildlife. No significant human health risks were identified in the HHRA. The ERA results indicate that site-related contaminants in surface soil, surface water, and sediment may pose a threat to ecological receptors such as fish, macro-invertebrates, birds, and other terrestrial species. Ecological receptors are exposed to heavy metals primarily by ingestion of mine waste, soils, sediments, surface water, vegetation, and prey as well as inhalation of toxic dusts. However, sediment contamination does not appear to be attributable to the rail line. Based on the RI and HHRA sampling, the average concentrations of lead and zinc in mine waste and contaminated soils are 761 ppm and 7,768 ppm, respectively. Additionally, the maximum values of lead and zinc in mine waste and contaminated soils are 16,533 ppm and 30,050 ppm. (Table 2). For more detail on the conceptual site model, see Figure 3.

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Ecological Risk

The ERA for CCR OU8 was conducted in accordance with the EPA's Ecological Risk Assessment Guidance for Superfund (EPA, 1992b), supplemented with more recent guidance and policy as appropriate. Site characterization data collected during the RI was completed by Hydrogeologic, Inc., and samples collected from additional matrices by the EPA were used in the ERA to evaluate possible health risks for wildlife within the study area.

Metals present in the chat could potentially migrate into the underlying soil. Additional migration pathways include soil to surface water/sediment, air to soil, and bioaccumulation. The potentially exposed ecological populations include benthic organisms, fish, terrestrial plants, soil organisms, and wildlife receptors (birds and mammals).

In terms of ecological receptors, the media of concern consist of potentially contaminated surface soil, surface water, and sediment. Exposure can occur through direct contact with these media. Sediment and surface water are being addressed under a separate OU. For birds and mammals, exposure pathways also include incidental ingestion of soil and consumption of food (e.g., plants, invertebrates, fish, mammals) with contaminants accumulated in the tissue (Table 3). Although animals can inhale soil contaminants in dust, that inhalation pathway contributes negligibly as compared to the ingestion exposure route and thus is not typically evaluated. Fur and feathers minimize the potential for dermal absorption of contaminants.

A streamlined approach was used to characterize ecological risk in which concentrations protective of ecology were compared directly to previously established Cherokee County cleanup levels. These cleanup levels for soil were established in the ROD for OU 03 and OU 04. The cleanup levels are meant to represent concentrations above which animals may exhibit impaired health from exposure to metals. Compared to these cleanup levels, lead and zinc contamination was widespread on the rail lines. CCR OU 08-specific cleanup levels for lead and zinc were then developed to account for the limited wildlife exposure due to rail line contamination. Prior to adjusting cleanup levels for the rail lines, it was determined that a simplified approach could be taken by focusing on zinc and lead. Although cadmium concentrations were elevated at every rail line location, zinc appears to diminish the toxicity of

cadmium. Thus, high concentrations of zinc may interfere with the absorption of cadmium, and the high zinc-to-cadmium ratio (approximately 150 to 1) along with the close correlation between these two elements probably protects terrestrial food chains somewhat from cadmium toxicity. More importantly, zinc toxicosis, (resulting in reduced survival) has been documented in both birds and mammals in the TSMD. Lead poisoning has also been documented in waterfowl, and elevated tissue concentrations of lead have been confirmed in wild birds. These cleanup levels are based on the same terrestrial assessment endpoint and corresponding exposure assumptions for vermivore receptors used to calculate the Cherokee County ecological cleanup levels. However, the toxicity reference value (TRV) accounts for a short-term (acute) exposure scenario. These rail line-specific cleanup levels are 1,770 mg/kg for lead and 4,000 mg/kg for zinc.

Based on survival of vermivore receptors, the COCs and cleanup levels for mine waste and contaminated soils in the CCR OU 08 rail lines to protect the ecological receptors are:

- Lead - 1,770 ppm
- Zinc - 4,000 ppm

The EPA believes, based on the toxicity studies conducted for the CCR OU 08, that the cleanup levels are protective of the terrestrial systems in the Site. (See Table 1.)

Human Health Risk

A HHRA was conducted for the site consistent with current EPA guidelines for HHRA at Superfund sites (USEPA 1989; 1991a; 1991b; 1992a; 2002a; 2002b; 2004; 2009). Site characterization data collected during the RI was used in the HHRA to evaluate possible health risks for recreational visitors and hypothetical future construction/excavation workers within the study area. Assumptions, methods, and results are summarized below.

High- and low-frequency recreational visitors and hypothetical future workers were identified as potentially exposed receptors for CCR OU 08. Recreational visitors (child, adolescent, and adult) are those who may walk, hike, play, and/or trespass along the historic rail lines in the area and be exposed via direct contact with surface soils along the rail beds. The hypothetical future worker represents construction/excavation workers who may be exposed via direct contact with surface and subsurface soils along the rail beds.

The exposure pathways identified and evaluated in the HHRA include incidental ingestion of surface soil, dermal contact with surface soil, and inhalation of airborne soil particles. Based on the results of the HHRA, human health risks for the recreational visitor (child, adolescent, and adult) and hypothetical future worker were below non-cancer hazard indexes of 1, and cancer risks were within the EPA's target risk range of 1E-06 to 1E-04 for non-lead metals. For lead, using the Integrated Exposure Uptake Biokinetic model for children and the Adult Lead Methodology for adults, the probability that blood lead levels would exceed 10 micrograms per deciliter (µg/dL) were below the EPA's health-based guideline (≤ 5 percent) for all receptors.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are quantitative, medium-specific goals for protecting human health and the environment. The RAOs specific to mine waste and soil are presented in this section.

Mine waste and contaminated soil at the CCR OU 08 will be addressed as part of this remedy. The exposure pathway of concern for the mine waste and contaminated soil RAOs is the movement and redistribution of source materials that could result in exposure of ecological receptors to elevated COC concentrations. The COCs for mine waste and contaminated soil for ecological receptors are lead and zinc.

Mine Waste RAO

The mine waste RAO is designed to address the potential risks associated with direct exposure to COCs in the mine waste, including chat. The mine waste RAO is as follows:

- Prevent exposure of ecological receptors to COCs in mine waste that would potentially result in unacceptable ecological risks.

Based on the Streamlined ERA, mine waste containing less than 1,770 ppm lead and less than 4,000 ppm zinc are deemed acceptable for these potential ecological risks. However, in order to access the majority of the contaminated soils, the railroad ballast material visually identified as chat would first need to be removed and then the underlying area would be screened to verify that metals concentrations in the remaining soil are at or below cleanup levels. Excavation and removal of the underlying soil would continue until the criteria described in the Soil RAO are met.

Soil RAO

The soil RAO is designed to address the potential risks associated with direct exposure to COCs in the contaminated soils. The soil RAO is as follows:

- Prevent exposure of ecological receptors to COCs in soils that would potentially result in unacceptable ecological risks.

Based on the Streamlined ERA, soils containing less than 1,770 ppm lead and less than 4,000 ppm zinc are deemed acceptable for these potential ecological risks.

DESCRIPTION OF ALTERNATIVES

The EPA developed and evaluated four remedial action alternatives during the FS. The No Action alternative was also evaluated; however, the EPA believes that the No Action Alternative is not protective of ecological receptors, and therefore it is not considered a viable option. Additionally, each of the alternatives would require, to varying degrees, institutional controls (ICs) to protect and augment the remedy. The four action alternatives focus on mine waste and contaminated soils.

After implementing the Selected Remedy, a substantial amount of currently inaccessible land will be available for beneficial use. CCR OU 08 removal areas will be included in the site-wide IC program for purposes of monitoring for disturbance in reference to changes in the use of the properties. The Selected

Remedy will eliminate surface water and sediment contamination from surficial runoff from mine waste. Surface water and sediment contamination will be addressed under separate OUs.

Alternative 1 – No Action

Estimated Total Capital Cost: $0
Estimated Annual O&M Cost: $0
Estimated Present Worth Cost: $103,324
Estimated Construction Time Frame: None
Estimated Time to Achieve RAOs: RAOs unachievable

A No Action alternative is required by the NCP, 40 CFR § 300.430(e)(6), to provide an environmental baseline against which impacts of the various remedial alternatives can be compared. Under the No Action alternative, all current remedial activities would cease and no further action would be taken at the site to remediate contaminated soils or address the associated risks to human health or the environment. Five-year reviews would be performed as required by the NCP to evaluate whether adequate protection of human health and the environment is provided.

Alternative 2 – Source Removal, On-Site Consolidation and Capping

Estimated Total Capital Cost: $14,250,426
Estimated Annual O&M Cost: $26,130
Estimated Present Worth Cost: $14,964,586
Estimated Construction Time Frame: 118 days
Estimated Time to Achieve RAOs: 232 days

Alternative 2 provides protection of ecological receptors through excavation and capping of contaminated materials on site to limit exposure. Under this alternative, all ballast and contaminated soil where concentrations of cadmium, lead, and/or zinc exceed the cleanup levels would be excavated and then consolidated and capped in small containment areas on site. Assuming that some amounts of soil below the footprint of the former rail bed would require removal, excavated areas would be backfilled with clean fill. Vegetative cover would be established over the removal and capped areas to restore the property and to provide vegetative root systems to hold the soil in place, preventing erosion and off-site transport by surface runoff or wind.

Source Removal
This alternative includes the removal of contaminated material above and below grade and backfilling the excavation with clean soil. Based on FS calculations, approximately 266,000 cubic yards of material would require excavation and consolidation. Assuming that the excavations would be backfilled to provide positive drainage, the amount of backfill would be approximately 82,000 cubic yards. Railroad ballast material visually identified as chat would be removed and then the underlying area would be scanned using an XRF to verify that metals concentrations in the remaining soil are at or below cleanup levels. Excavation and removal of the underlying soil would continue until these criteria are met. A hydraulic excavator would be used to excavate the material and load dump trucks for transport and placement at on-site waste consolidation areas. The excavated areas would be backfilled with clean fill and graded to provide positive drainage. Erosion and sediment controls would be maintained for one year while the vegetative cover was being established on the backfilled areas.

On-Site Waste Consolidation and Capping

The excavated materials would be placed in consolidation areas at each work site or within a cluster of closely spaced small sites. A bulldozer or other grading equipment would be used to grade the mine waste in the consolidation areas. The consolidation area would be capped with 12 inches of locally available clayey soil and 6 inches of topsoil. An estimated 176,000 cubic yards of fill material will be required to construct the cover on the consolidation areas. This type of cap configuration has been successfully implemented at similar OUs in Cherokee County. ICs would be required so that the consolidation areas are not disturbed, thereby preventing exposure of the contaminated materials. O&M would be required to maintain the integrity of the soil cover. For the purposes of this FS, this alternative assumes that sufficient cover soil and topsoil are available within a 10-mile radius of each site and in the quantities and time frame required for establishing vegetative growth. It also assumes that the consolidation areas will overlay a portion of the former rail beds (reducing the amount of material to be excavated) and that approximately 58 small containment areas will be needed.

Alternative 3 – Source Removal with Consolidation and Capping at OU3/OU4 Consolidation Areas

Estimated Total Capital Cost: $15,832,363
Estimated Annual O&M Cost: $7,454
Estimated Present Worth Cost: $16,028,070
Estimated Construction Time Frame: 144 days
Estimated Time to Achieve RAOs: 256 days

Alternative 3 provides protection of ecological receptors through excavation and removal, with disposal at OU3/OU4 consolidation areas. This alternative is similar to Alternative 2, as all ballast material and contaminated soil with metals concentrations exceeding the cleanup levels would be excavated and removed. However, these wastes would be transported to existing consolidation areas for consolidation and capping. ICs will be in place at the OU3/OU4 consolidation areas so that the consolidation areas are not disturbed, thereby preventing exposure of the contaminated materials. O&M is also provided at the OU3/OU4 consolidation areas. The site-wide IC program would include the CCR OU 08 removal areas to monitor for disturbance and in reference to changes in use of the properties.

Source Removal

This alternative includes the same approach to removal of mining wastes and the underlying contaminated soil as described for Alternative 2. Based on the FS calculations, approximately 324,000 cubic yards would require excavation and disposal, and approximately 186,000 cubic yards would be required for backfill to bring the excavation up to grade.

Waste Consolidation and Capping

The excavated materials would be loaded into haul trucks and transported to a central consolidation area. It is assumed that the increase in the amount of materials needed to cover the consolidation areas is negligible for the purposes of this ROD. For the purpose of estimating costs and level of effort, it is assumed that one of the proposed waste consolidation areas to be constructed as part of the OU3/OU4 Phase 2 and 3 RAs would have adequate capacity to receive these materials, would be located within a 20-mile radius of each removal area, and would actively be undergoing construction at the same time as the CCR OU 08 removal activities.

Alternative 4 – On-Site Capping

Estimated Total Capital Cost: $9,071,027
Estimated Annual O&M Cost: $53,100
Estimated Present Worth Cost: $10,449,588
Estimated Construction Time Frame: 114 days
Estimated Time to Achieve RAOs: 226 days

This alternative involves capping the waste in place to prevent ecological contact, and represents an estimated 324,000 cubic yards. The cap would consist of 12 inches of locally available clayey soil and 6 inches of topsoil. Approximately 211,000 cubic yards of material would be required to cap the former rail bed in place, assuming an extent of 39 miles of rail lines in CCR OU8. This type of cap configuration has been successfully implemented at similar OUs addressed as part of the previous Baxter Springs, Treece, Waco, and Lawton mine waste remedies. The alternative assumes that sufficient cover soil, topsoil, or soil amendments are available within a 10-mile radius of each site and in the quantities and time frame required for establishing vegetative growth. ICs would be required so that the consolidation areas are not disturbed, thereby preventing exposure of the contaminated materials. O&M would be required to maintain the integrity of the soil cover, which is expected to extend for approximately 39 miles along the rail lines.

COMPARATIVE ANALYSIS OF ALTERNATIVES

The NCP requires the EPA to evaluate the Selected Remedy against nine criteria, set forth in 40 CFR § 300.430(e)(9). Any selected remedy must satisfy all nine criteria before it can be implemented. The nine criteria described in the table below are divided into the following groupings: two threshold criteria, five balancing criteria, and two modifying criteria. Alternatives must satisfy the threshold criteria, with the exception of the required No Action alternative, and be protective of human health and the environment and compliant with ARARs (unless a waiver is justified), or they are rejected without further considering the remaining criteria. ARARs are available in Appendix E. The balancing criteria consist of the following: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume achieved through treatment; implementability; short-term effectiveness; and cost. The modifying criteria, state and community acceptance, were fully evaluated following state and public input as discussed in this document and the Responsiveness Summary (Appendix D).

Evaluation Criteria for Superfund Remedial Alternatives
1. **Overall Protection of Human Health and the Environment** determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
2. **Compliance with ARARs** evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
3. **Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.
4. **Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
7. **Cost** includes estimated capital and annual O&M costs, as well as present worth cost. Present worth cost is the total of an alternative over time in today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
8. **State/Support Agency Acceptance** considers whether the State agrees with the EPA's analyses and preferred alternative, as described in the RI/FS and Proposed Plan.
9. **Community Acceptance** considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Threshold Criteria

Overall Protection of Human Health and the Environment

Protection of human health and the environment is addressed to varying degrees by the four evaluated alternatives. The No Action Alternative would have no effect on contaminated soil. Therefore, it does not address risks to human health and the environment.

Alternatives 2, 3, and 4 all provide protection by reducing exposure of ecological receptors to metals in ballast and contaminated soils. Permanence is provided in Alternatives 2 and 3 through removal and containment of contaminated materials with lead or zinc concentrations at or above their respective cleanup levels. Permanence is provided in Alternative 4 by capping the contaminated materials in place. Alternatives 2 and 4 leave contaminated materials on site, whereas Alternative 3 does not. Therefore, Alternative 3 is the most protective of human health and the environment.

Compliance with ARARs

The No Action Alternative would not meet ARARs, whereas the remainder of the alternatives meet federal and state ARARs. Chemical-, location-, and action-specific state and federal ARARs for the remainder of the alternatives would be achieved by making sure all materials exceeding cleanup levels are capped with a soil cover either on or off site. All alternatives except Alternative 1 would achieve ambient air quality regulations by keeping the duration of excavation to a minimum and by employing dust suppression measures while excavating and transporting contaminated soil. In addition, all alternatives except Alternative 1 would remove or cover all contaminated materials with concentrations

greater than the cleanup levels and would achieve the goal of reducing the risk of exposure to ecological receptors. ARARs are available in Appendix E.

Primary Balancing Criteria

Long-term Effectiveness and Permanence

Alternative 1 would not provide long-term effectiveness for the protection of health and environment. Under the remainder of the alternatives, the residual risks (the risk remaining after implementation) would be significantly reduced. The removal or capping of contaminated soil ensures that future potential for exposure would be significantly reduced. Alternative 3 would provide the most permanence by removing all ballast and contaminated soils and disposing of them off site. Alternatives 2 and 4 would provide less permanence because contaminated materials would remain on site and could potentially be exposed if cover material were to become disturbed.

Reduction of Toxicity, Mobility or Volume of Contaminants through Treatment

There would be no reduction in the toxicity, mobility, or volume of contamination through treatment under any of the remedial alternatives.

Alternatives 2, 3, and 4 would significantly reduce the mobility of the contaminants on site. Only Alternative 3 reduces the volume of contaminants on site. None of the alternatives would reduce the toxicity of the contaminants. Treatment methods identified in the FS that would be appropriate for heavy metals contamination are pozzolanic stabilization, phosphate stabilization, and phytoextraction. The limitations with in-place pozzolanic stabilization include increased material volume. The majority of the former rail beds are in rural areas, and in many instances are in the middle of pastures or fields where "paved" areas would not be desirable. Pilot scale studies performed at other sites have demonstrated that in the short-term, phosphate stabilization may reduce the bioavailability of lead by 30 to 50 percent in residential soils; however, it is only effective on lead concentrations less than 1,200 mg/kg (Mosby, et al., 2006). Its effectiveness on chat is unknown because chat is not a fine grained material like residential soils. In addition, the use of phosphoric acid, which is the most effective for long term stabilization of lead, may cause increased short term leaching of zinc (Mosby, et al., 2006). The data for this Site shows that zinc contamination above the cleanup levels is more widespread than lead contamination. Plants used for phytoextraction may accumulate high concentrations of metals which may necessitate the disposal of plant matter as special waste. In addition, getting plants to grow in the chat may be problematic. Based on these reasons, these technologies will not be carried forward for consideration in developing remedial alternatives to address the site risks.

No other treatment technologies were identified to adequately remediate the volume and type of waste at the CCR OU 08. If such technology is identified at a later date, pilot studies and related analysis may support a remedy decision change.

Short-term Effectiveness

There would be no short-term risk to workers for Alternative 1 because no remediation efforts would be performed. However, exposure pathways would remain.

Alternatives 2 and 3 would have increased short-term risks for the public, environment, and construction workers during excavation, backfilling, and transportation efforts. Disturbed contaminated soil could enter the ambient air during excavation and transportation. However, dust suppression measures would be implemented for the protection of community and workers during the RA. The alternatives would be

lengthy to implement, requiring years to complete. Alternative 3 has a higher airborne dust risk than Alternative 2 because of the increased haul distance, and thus an extended duration to complete implementation of the remedial alternative. Alternative 4 would have fewer short-term risks than Alternatives 2 or 3 because contaminated materials would not be excavated, but would be capped in place.

Implementability

Alternative 1 is highly implementable, requiring only Five-Year Reviews. The technologies involved in the remaining alternatives are readily implementable and are technically feasible from an engineering perspective. Earthwork is a typical construction operation. The experience from previous work conducted for the other Cherokee County OUs by the EPA has shown that all four of these alternatives would be readily implementable.

Cost

The total present value of the alternatives are estimated to be:

- Alternative 1 - $103,324 with O&M costs of $0
- Alternative 2 - $14,964,586 with O&M costs of $627,533
- Alternative 3 - $16,028,070 with O&M costs of $179,010
- Alternative 4 - $10,449,588 with O&M costs of $1,275,238

No capital or O&M costs would be associated with Alternative 1 because no RAs would be conducted. However, it is assumed that Five-Year Review costs would be associated with Alternative 1 (periodic costs). Alternatives 2, 3, and 4 incur capital, O&M, and periodic costs.

Capital costs include the RA work and implementation of ICs. O&M costs include inspections and maintenance of the consolidation areas to maintain the integrity of the caps. Periodic costs include Five-Year Reviews. Alternative 3 would have the lowest O&M costs as O&M and ICs would be required only for the off-site consolidation areas that would be maintained as part of the OU 04 Phase 3 Baxter/Treece RAs.

Future O&M and periodic costs are included and reduced by a present value discount rate. The use of discount rates for present value cost analyses is stated in the preamble to the NCP (55 FR 8722) and in OSWER Directive 9355.3-20 (Revisions to Office of Management and Budget [OMB] Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis, 1993). As outlined in "A Guide to Developing and Documenting Cost Estimates during the Feasibility Study" (EPA, 2000), a 7 percent real discount rate should be applied over the period of evaluation for each alternative. The 30-year nominal treasury interest rates (OMB, 2015) for the last 20 years have generally been less than 6 percent, and inflation over the same period has averaged around 3 percent per year. Thus, the 7 percent real discount rate is not appropriate to use for estimating cost for the alternative evaluation in this FS for the reasons cited. Based on the Table of Past Years Discount Rates from Appendix C of OMB Circular No. A-94, a discount rate of 1.5 % was applied to the cost calculations.

Modifying Criteria

State/Support Agency Acceptance
KDHE staff generally supports the Preferred Alternative (Alternative 3) proposed by the EPA. State acceptance was provided in a letter from the KDHE dated September 2016. The letter of concurrence can be found in the AR.

Community Acceptance
The EPA did not receive any comments on the proposed amendment that resulted in changes to this ROD. In general, the local community supported the Selected Remedy as presented in the Proposed Plan as the Preferred Alternative. Questions posed by local citizens were generally about impact to their individual properties and the timeframe of the remedy. The significant comments received from the public are included in the Responsiveness Summary in Appendix D. A copy of the transcript from the public meeting can be found in the AR.

PRINCIPAL THREAT WASTE

The residual waste found in the CCR OU 08 rail lines is considered a low-level threat waste, which is defined as source materials containing COCs that generally are relatively immobile in air or groundwater in the specific environmental setting (OSWER, Publication 9380.3-06FS, 1991). However, the residual waste in the CCR OU 08 rail lines has the potential to be a principal threat waste when it is mobilized by mechanical means, making remediation necessary to mitigate the potential risk. Treatment methods identified that would be appropriate for heavy metals contamination are pozzolanic stabilization, phosphate stabilization, and phytoextraction. These methods were not carried forward into the remedial alternatives for the following reasons: material type, potentially expensive methods to stabilize or treat intermittent stream sediments, and the effectiveness of nontreatment alternatives for the limited volume of contaminated intermittent stream sediments. Treatment is not a component of the Selected Remedy, and therefore would not reduce the toxicity, mobility, or volume of contamination at the Site. Overall, containment will be employed due to the effectiveness of nontreatment technologies (excavation, consolidation, capping, revegetating) for mine waste and contaminated soils. No other treatment technologies were identified to adequately remediate the volume and type of waste at the CCR OU 08. If such technology is identified at a later date, pilot studies and related analysis may support a remedy decision change.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

The Selected Remedy for CCR OU 08 is Alternative 3 - Source Removal with Consolidation and Capping at OU3/OU4 Consolidation Areas. The Selected Remedy was chosen over the other alternatives by the EPA because, among other reasons, it will achieve RAOs and provides the best balance of the available options with respect to the nine NCP criteria. Alternative 3 is a continuation of previous remedial actions at the Site to excavate and replace metals-contaminated soil. Additionally, Alternative 3 utilizes available space at current or future planned consolidation areas instead of creating new consolidation areas in the Site. Of the three alternatives that meet the threshold criteria, Alternative 3 is the better of the three with respect to long-term effectiveness and permanence because the alternative does not leave contaminated materials as a part of CCR OU 08. The EPA has met the RAOs with other remedial actions at the Site by employing alternatives similar to Alternative 3 with respect to the key

components. Although there are slightly higher capital costs associated with Alternative 3, this alternative would provide the most permanence by removing all ballast and contaminated soils and disposing of them in other Site consolidation areas. Also, Alternative 3 has the least amount of O&M costs compared to the other three alternatives that met the threshold criteria.

The Streamlined ERA, which is the basis for the RAOs, clearly supports the need to take action at the inactive rail lines throughout CCR OU 08. This remedy was selected to eliminate exposure of the ecological receptors to the COCs contained in mine waste and contaminated soil associated with the inactive rail lines.

Description of the Selected Remedy

This section presents the detailed description of the EPA's Selected Remedy, which is Alternative 3 in the FS. Alternative 3 is a remedial alternative based on excavating and disposing of mine waste and contaminated soils in on-site consolidation areas in the OU 03 and OU 04 subsites for addressing the principal threats. This alternative relies on excavation and on-site disposal, containment, and capping of source materials to attain the RAOs. Detailed costs associated with the implementation of Alternative 3 are presented in Appendix B. The total cost estimated for this alternative is $16,028,070 for capital costs, with an estimated O&M cost of $179,010.

The Selected Remedy includes the removal of contaminated material above and below grade and backfilling the excavation with clean soil. Railroad ballast material visually identified as chat would be removed and then the underlying area would be scanned using x-ray fluorescence (XRF) to verify that metals concentrations in the remaining soil are at or below cleanup levels. Excavation and removal of the underlying soil would continue until these criteria are met. A hydraulic excavator would be used to excavate the material and load dump trucks for transport and placement at on-site waste consolidation areas. The excavated areas would be backfilled with clean fill and graded to provide positive drainage. Erosion and sediment controls will be maintained for one year while the vegetative cover is being established on the backfilled areas.

The excavated materials would be loaded into haul trucks and transported to a central consolidation area. For the purpose of estimating costs and level of effort, it is assumed that one of the proposed waste consolidation areas to be constructed as part of the OU 04 Phase 2/3 Baxter/Treece RAs would have adequate capacity to receive these materials, would be located within a 20-mile radius of each removal area, and would actively be undergoing construction at the same time as the CCR OU 08 removal activities. The consolidation would not significantly enlarge the OU 03/04 consolidations areas, and the removal of materials from the OU 08 areas will make available other areas in the county suitable for agricultural or other non-residential use. CCR OU 08 removal areas will be included in the site-wide IC program for purposes of monitoring for disturbance in reference to changes in the use of the properties.

Based on survival of vermivore receptors, the cleanup levels for mine waste and contaminated soils in the CCR OU 08 rail lines to protect the ecological receptors are:

- Lead - 1,770 ppm
- Zinc - 4,000 ppm

The EPA is prepared to begin design of the Selected Remedy within 12 months of issuance of the ROD. Following the completion of the Selected Remedy, an estimated 142 acres of land would be available for

beneficial use with much of the area restored to pasture land. The Selected Remedy is expected to be completed in two years and will achieve the RAOs for protection of wildlife populations.

STATUTORY DETERMINATION

Under CERCLA §121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes the preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

Protection of Human Health and the Environment

The Selected Remedy will protect human health and the environment through the removal of heavy metals-contaminated soil and mine waste by excavation, consolidation, and capping. Excavation, consolidation, and capping the mine waste and contaminated soil will eliminate the threat of exposure via direct contact with or ingestion of contaminated soil. The inactive rail lines pose a current and potential risk to ecological receptors. CCR OU 08-specific cleanup levels were developed based on the short-term exposure that ecological receptors have to the limited areal extent of the inactive rail lines. The cleanup levels are meant to represent concentrations above which animals may exhibit impaired health from exposure to metals. The Selected Remedy will reduce the risks to ecological receptors below the CCR OU 08 cleanup levels. There are no short-term threats associated with the Selected Remedy that cannot be readily controlled.

Compliance with Applicable or Relevant and Appropriate Requirements

The Selected Remedy of excavation, consolidation, and capping of mine waste and all contaminated soil complies with all ARARs. The ARARs are presented in Appendix E.

Other Criteria, Advisories, or Guidance To Be Considered (TBCs) for This Remedial Action

In implementing the Selected Remedy, the EPA and the State have agreed to consider a number of non-binding criteria that are TBCs. The TBCs are presented along with the ARARs in Appendix E.

Cost-Effectiveness

In the lead agency's judgment, the Selected Remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (NCP 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this

remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Selected Remedy is $16,028,070 for capital costs, with an estimated O&M cost of $179,010. The EPA believes that the Selected Remedy's additional cost for excavation provides a significant increase in protection of human health and the environment and is cost-effective.

Utilization of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

The Selected Remedy provides permanence by removing all mine waste and contaminated soils and disposing them in other Site consolidation areas. Treatment is not a component of the Selected Remedy, and therefore would not reduce the toxicity, mobility, or volume of contamination at the Site. Treatment methods identified in the FS that would be appropriate for heavy metals contamination are pozzolanic stabilization, phosphate stabilization, and phytoextraction. The limitations with in-place pozzolanic stabilization include increased material volume. The majority of the former rail beds are in rural areas, and in many instances are in the middle of pastures or fields where "paved" areas would not be desirable. Pilot scale studies performed at other sites have demonstrated that in the short-term, phosphate stabilization may reduce the bioavailability of lead by 30 to 50 percent in residential soils; however, it is only effective on lead concentrations less than 1,200 mg/kg (Mosby, et al., 2006). Its effectiveness on chat is unknown because chat is not a fine grained material like residential soils. In addition, the use of phosphoric acid, which is the most effective for long term stabilization of lead, may cause increased short term leaching of zinc (Mosby, et al., 2006). The data for this Site shows that zinc contamination above the cleanup levels is more widespread than lead contamination. Plants used for phytoextraction may accumulate high concentrations of metals which may necessitate the disposal of plant matter as special waste. In addition, getting plants to grow in the chat may be problematic. Based on these reasons, these technologies will not be carried forward for consideration in developing remedial alternatives to address the site risks.

No other treatment technologies were identified to adequately remediate the volume and type of waste at CCR OU 08. If such technology is identified at a later date, pilot studies and related analysis may support a remedy decision change.

Preference for Treatment as a Principal Element

The remedy for this OU does not satisfy the statutory preference for treatment as a principal element of the remedy for the following reasons: material type, potentially expensive methods to stabilize or treat mine waste and contaminated soil, and the effectiveness of nontreatment alternatives for the volume of mine waste and contaminated soil.

Five-Year Review Requirements

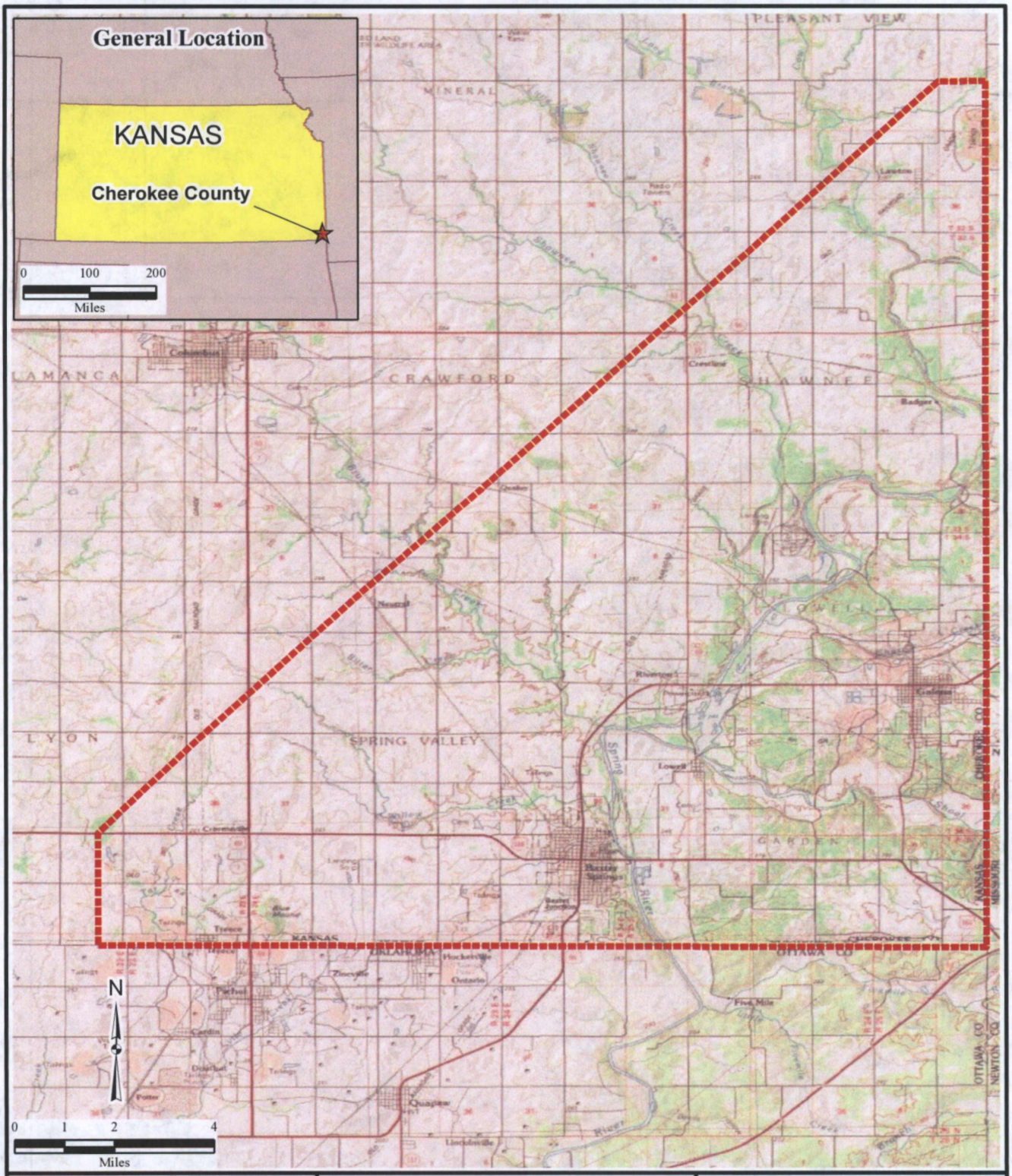
Because this remedy will result in hazardous substances, pollutants, or contaminants remaining above levels that allow for unlimited use and unrestricted exposure, a Five-Year Review will be required for this remedial action.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for CCR OU 08 was released for public comment in August 2016. The Proposed Plan identified the Preferred Alternative of excavating and disposing of mine waste and contaminated soils in on-site consolidation areas in the OU 03 and OU 04 subsites. The EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

APPENDIX A

FIGURES



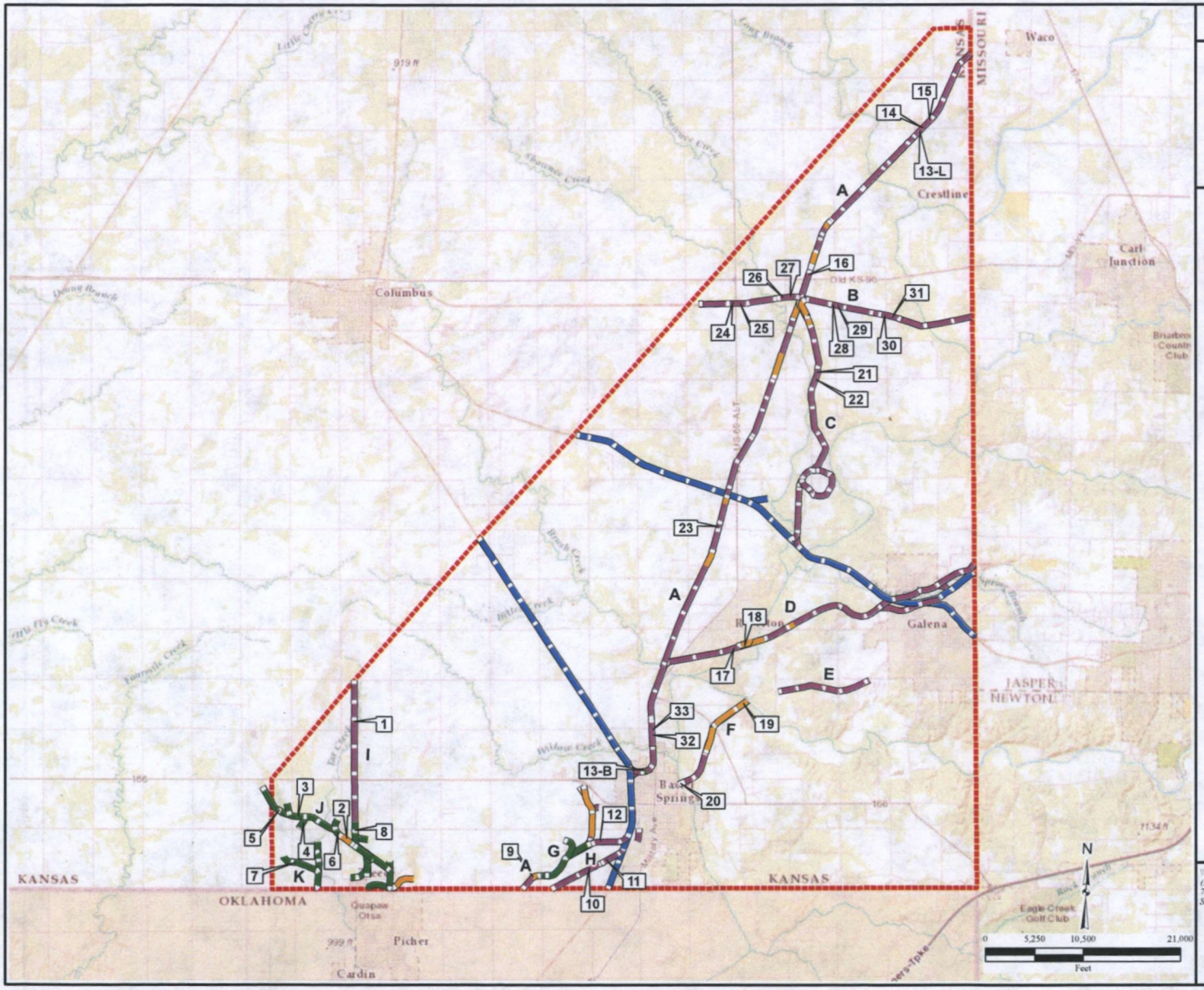
\\Gst-srv-01\HGLGIS\Cherokee_County_MSIW\FS\(2-01)Site_Vicinity.mxd
5/12/2016 JG
Source: HGL, ESRI Online USA Topo Maps

Legend

Site Boundary

Figure 1 Site Location

HGL HydroGeoLogic, Inc



HGL—Feasibility Study for Cherokee County Site OU8
Railroads, Cherokee County, Kansas

Figure 2
Former Rail Line Classifications and Sample Locations

Legend

- 10 — Sample Location
- Site Boundary

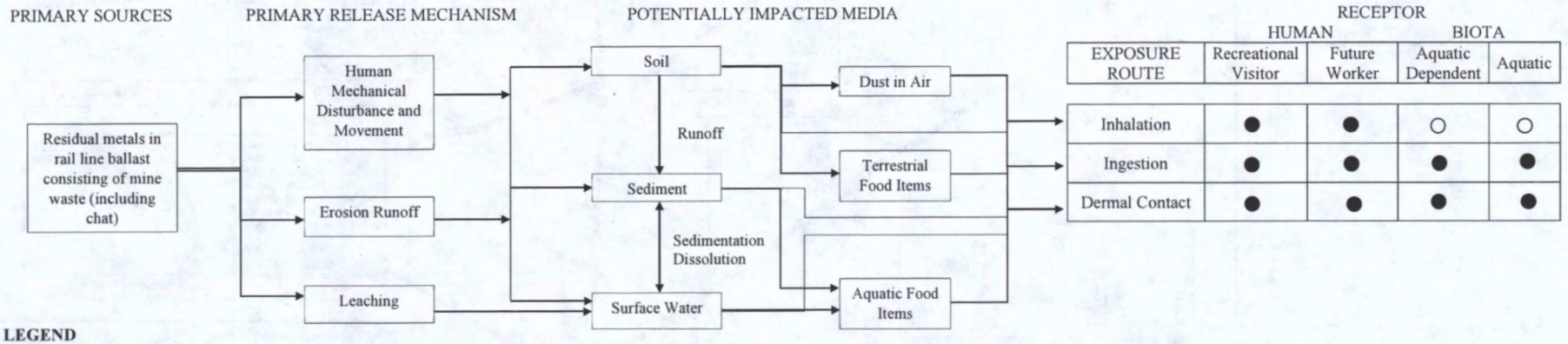
Rail Classification

- Active Line
- Former Line
- No Longer Present or Remediated
- Addressed Under Other OU
- A — Rail Line Designation for Estimation of Volume of Material Requiring Remediation

\\Gis-srv-01\HGLGIS\Cherokee_County_MSIW\FS\(2-02)RR_Class_Sample_Locs.mxd
7/29/2016 RJ
Source: HGL, ArcGIS Online USA Topo Map

HGL

FIGURE 3. Conceptual Site Model for Source Material and Contaminated Soil



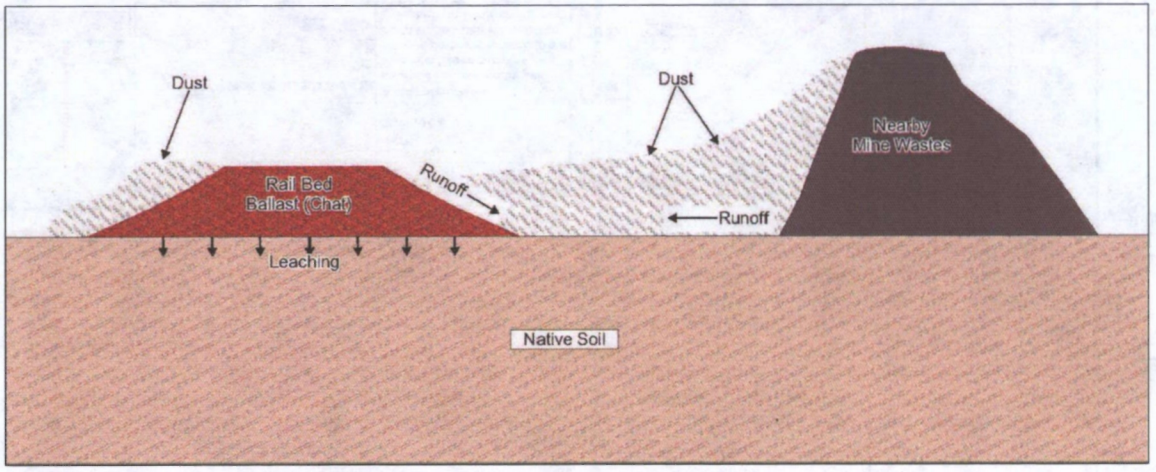
RECEPTOR

EXPOSURE ROUTE	HUMAN: Recreational Visitor	HUMAN: Future Worker	BIOTA: Aquatic Dependent	BIOTA: Aquatic
Inhalation	●	●	○	○
Ingestion	●	●	●	●
Dermal Contact	●	●	●	●

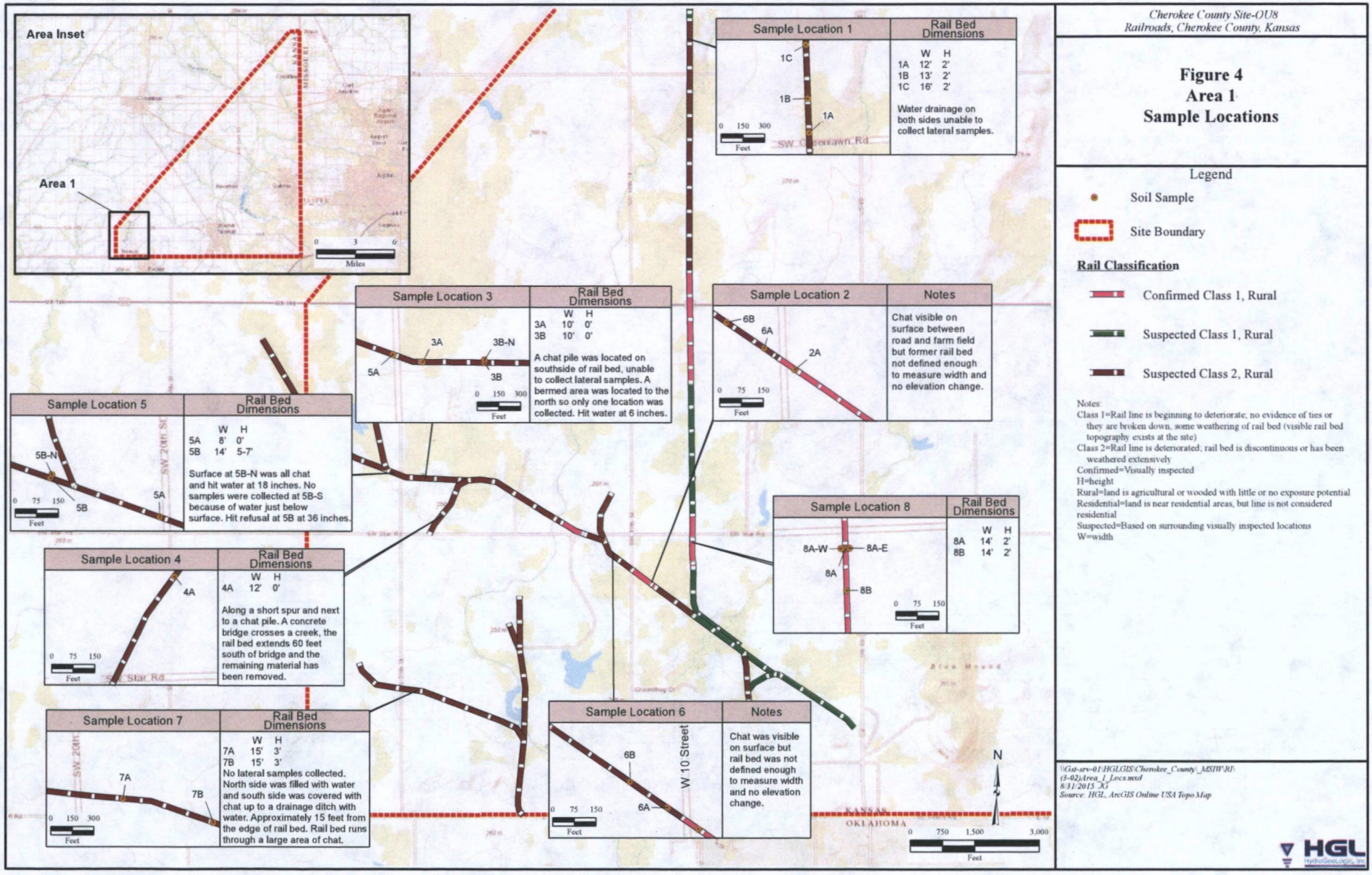
LEGEND

● Pathway is complete and might be significant; sufficient data are available for quantitative evaluation.

○ Pathway is not complete; no evaluation required.



Not to scale



Cherokee County Site-OU8
Railroads, Cherokee County, Kansas

Figure 4
Area 1
Sample Locations

Legend

- Soil Sample
- Site Boundary

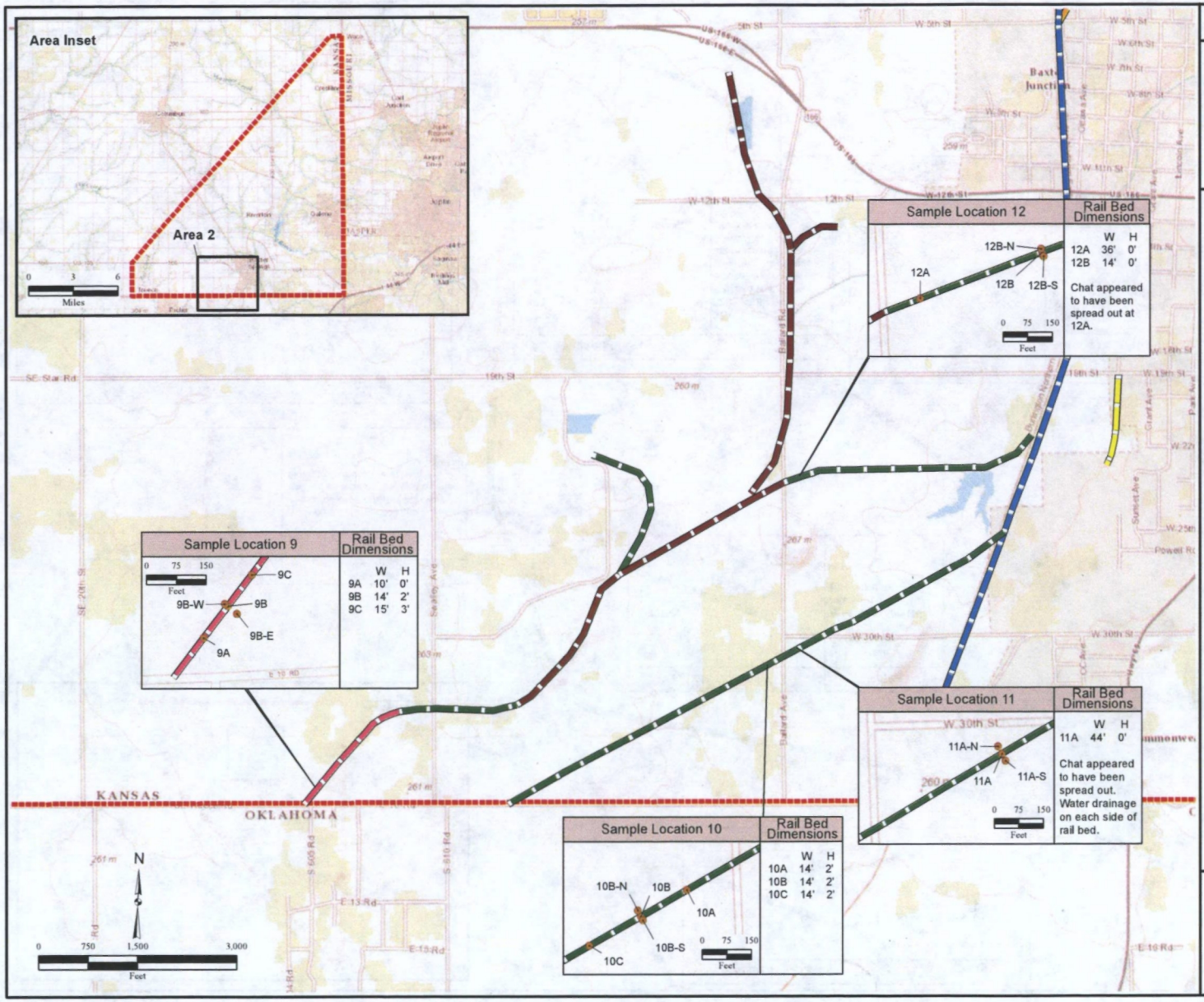
Rail Classification

- Confirmed Class 1, Rural
- Suspected Class 1, Rural
- Suspected Class 2, Rural

Notes:
Class 1=Rail line is beginning to deteriorate; no evidence of ties or they are broken down, some weathering of rail bed (visible rail bed topography exists at the site)
Class 2=Rail line is deteriorated; rail bed is discontinuous or has been weathered extensively
Confirmed=Visually inspected
H=height
Rural=land is agricultural or wooded with little or no exposure potential
Residential=land is near residential areas, but line is not considered residential
Suspected=Based on surrounding visually inspected locations
W=width

\\Gis-srv-01\HGLGIS\Cherokee_County_MSHWRI\ (3-02)Area_1_Locs.mxd
8/31/2015 KT
Source: HGL, ArcGIS Online USA Topo Map

HGL HydroGeologic, Inc.



Cherokee County Site-OU8
Railroads, Cherokee County, Kansas

Figure 5
Area 2
Sample Locations

Legend

- Soil Sample
- Site Boundary

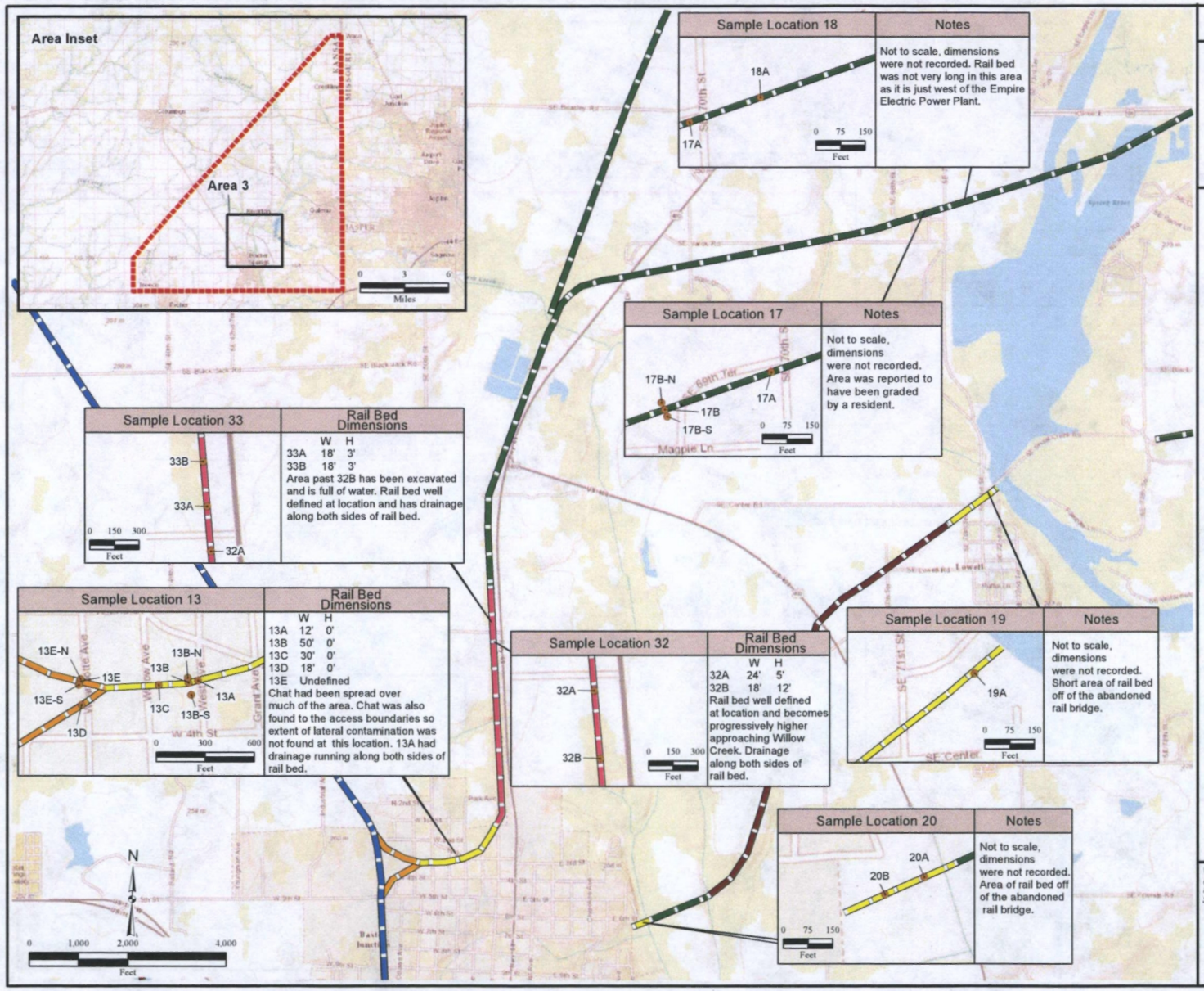
Rail Classification

- Active Line
- Confirmed Class 1, Residential
- Confirmed Class 1, Rural
- Suspected Class 1, Rural
- Suspected Class 2, Rural
- Suspected Class 2, Residential

Notes:
Class 1=Rail line is beginning to deteriorate; no evidence of ties or they are broken down, some weathering of rail bed (visible rail bed topography exists at the site)
Class 2=Rail line is deteriorated; rail bed is discontinuous or has been weathered extensively
Confirmed=Visually inspected
H=height
Rural=land is agricultural or wooded with little or no exposure potential
Residential=land is near residential areas, but line is not considered residential
Suspected=Based on surrounding visually inspected locations
W=width

\\Gis-srv-01\HGLGIS\Cherokee_County_MSIW\RI\(3-03)Area_2_Locs.mxd
8/31/2015 JCJ
Source: HGL, ArcGIS Online USA Topo Map

HGL HydroGeoLogic, Inc.



Cherokee County Site-OU8
Railroads, Cherokee County, Kansas

Figure 6
Area 3
Sample Locations

Legend

- Soil Sample
- Site Boundary

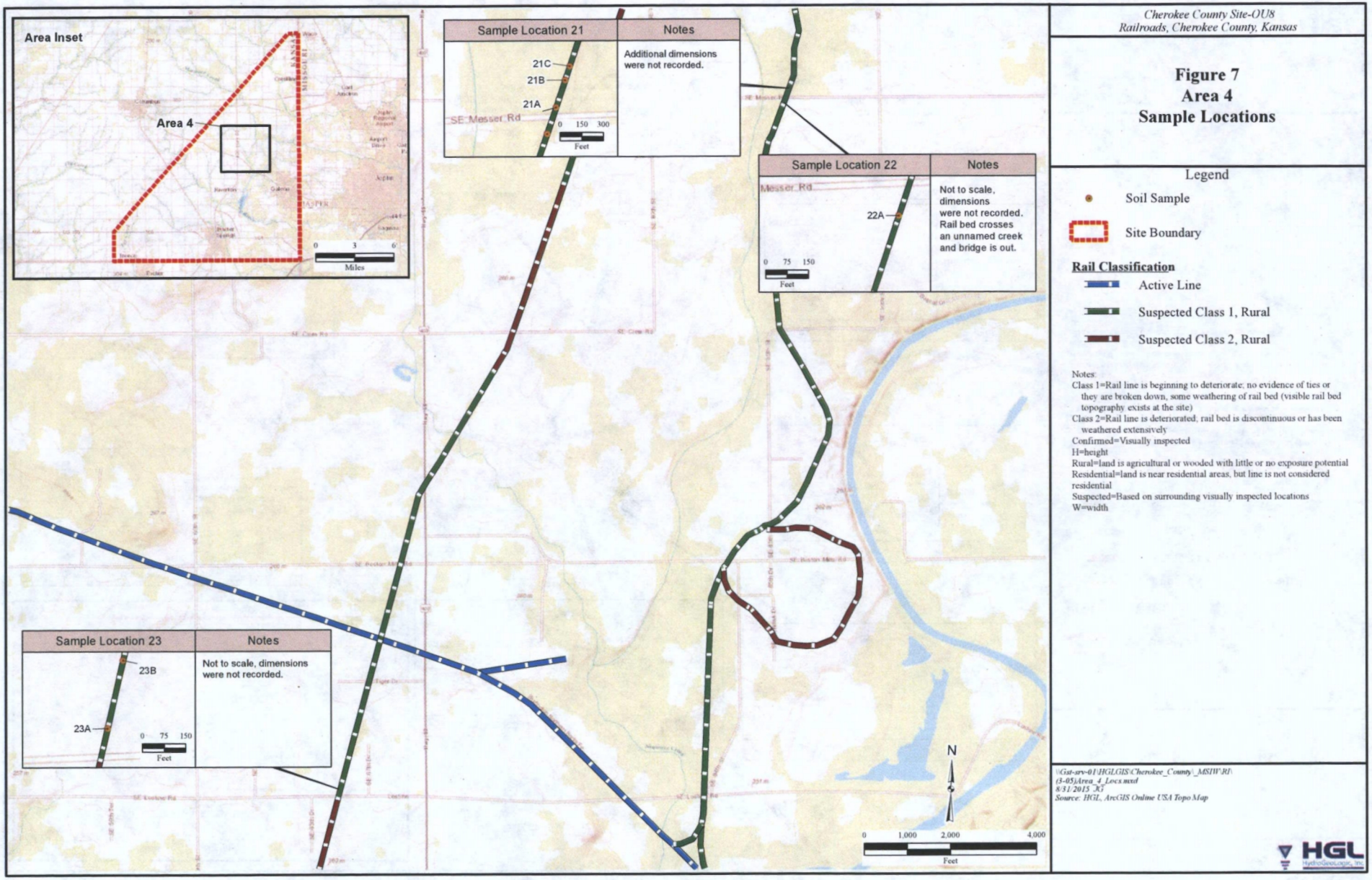
Rail Classification

- Active Line
- Confirmed Class 1, Residential
- Confirmed Class 1, Rural
- Suspected Class 1, Rural
- Suspected Class 2, Rural
- Suspected Class 2, Residential

Notes:
Class 1=Rail line is beginning to deteriorate; no evidence of ties or they are broken down, some weathering of rail bed (visible rail bed topography exists at the site)
Class 2=Rail line is deteriorated, rail bed is discontinuous or has been weathered extensively
Confirmed=Visually inspected
H=height
Rural=land is agricultural or wooded with little or no exposure potential
Residential=land is near residential areas, but line is not considered residential
Suspected=Based on surrounding visually inspected locations
W=width

\\Gst-srv-01\HGLGIS\Cherokee_County_MSIW\RI
(3-04)Area_3_Locs.mxd
8/31/2013 JS
Source: HGL, ArcGIS Online USA Topo Map

HGL HydroGeoLogic, Inc.



Cherokee County Site-OU8
Railroads, Cherokee County, Kansas

Figure 7
Area 4
Sample Locations

Legend

- Soil Sample
- Site Boundary

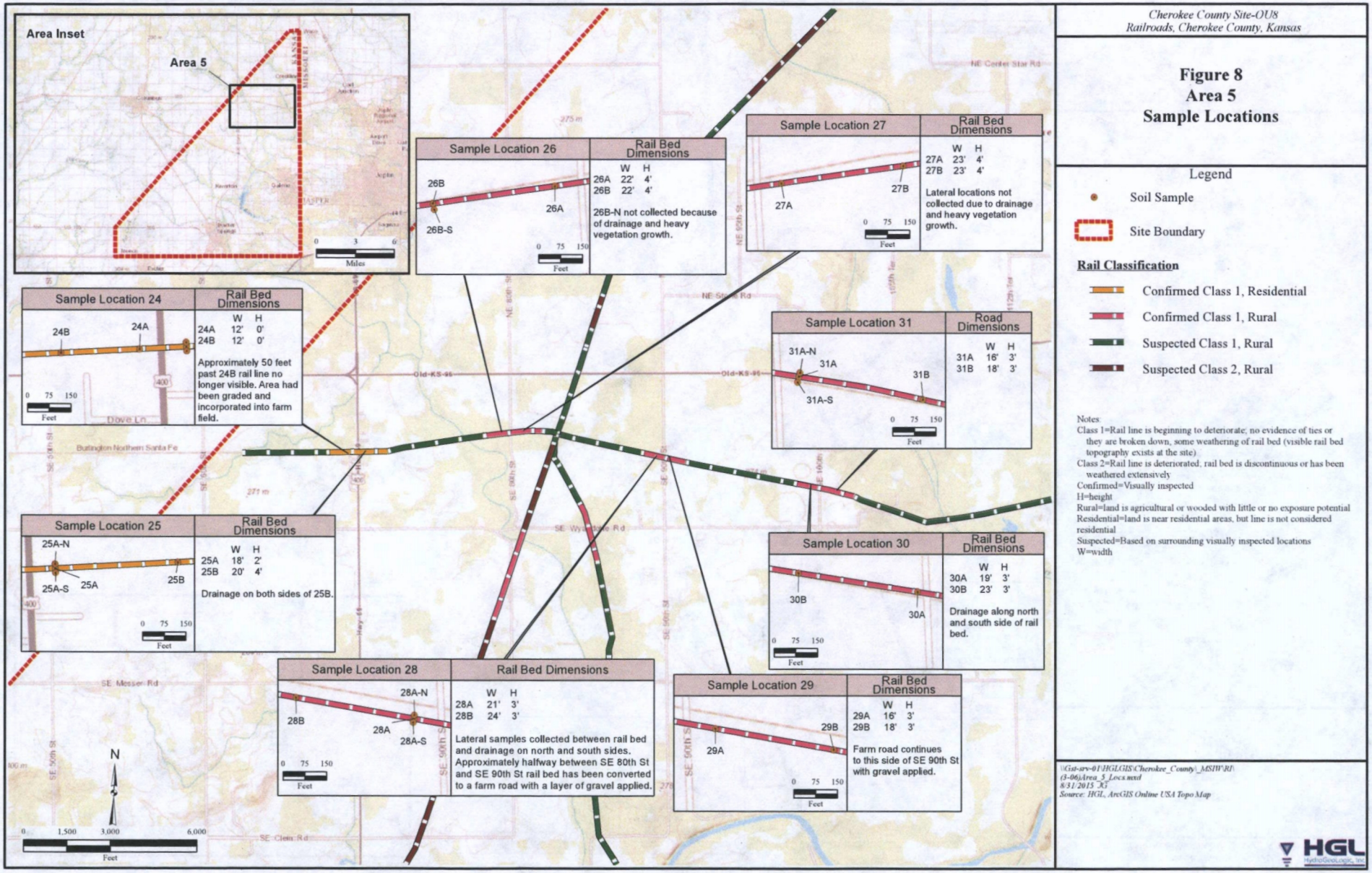
Rail Classification

- Active Line
- Suspected Class 1, Rural
- Suspected Class 2, Rural

Notes:
Class 1=Rail line is beginning to deteriorate; no evidence of ties or they are broken down, some weathering of rail bed (visible rail bed topography exists at the site)
Class 2=Rail line is deteriorated; rail bed is discontinuous or has been weathered extensively
Confirmed=Visually inspected
H=height
Rural=land is agricultural or wooded with little or no exposure potential
Residential=land is near residential areas, but line is not considered residential
Suspected=Based on surrounding visually inspected locations
W=width

\\Gst-srv-01\HGLGIS\Cherokee_County_MSIW\RI
(3-05)Area_4_Locs.mxd
8/31/2015 JCJ
Source: HGL, ArcGIS Online USA Topo Map

HGL HydroGeoLogic, Inc.



Cherokee County Site-OU8
Railroads, Cherokee County, Kansas

Figure 8
Area 5
Sample Locations

Legend

- Soil Sample
- Site Boundary

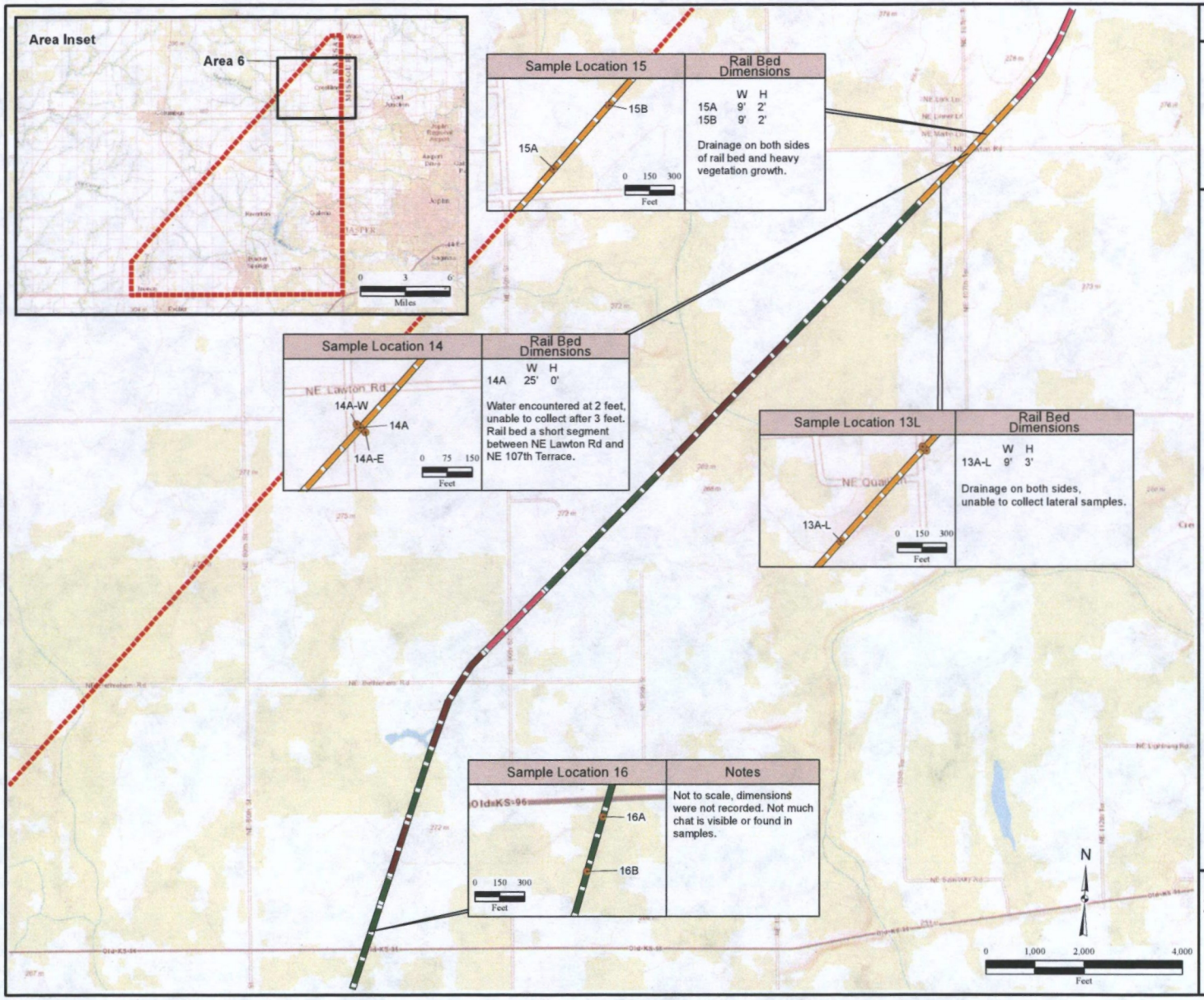
Rail Classification

- Confirmed Class 1, Residential
- Confirmed Class 1, Rural
- Suspected Class 1, Rural
- Suspected Class 2, Rural

Notes:
Class 1=Rail line is beginning to deteriorate; no evidence of ties or they are broken down, some weathering of rail bed (visible rail bed topography exists at the site)
Class 2=Rail line is deteriorated; rail bed is discontinuous or has been weathered extensively
Confirmed=Visually inspected
H=height
Rural=land is agricultural or wooded with little or no exposure potential
Residential=land is near residential areas, but line is not considered residential
Suspected=Based on surrounding visually inspected locations
W=width

\\Gst-srv-01\HGLGIS\Cherokee_County_MSIW\RI\(3-06)Area_5_Locs.mxd
8/31/2015 JCJ
Source: HGL, ArcGIS Online USA Topo Map

HGL
HydroGeoLogic, Inc.



Cherokee County Site-OU8
Railroads, Cherokee County, Kansas

Figure 9
Area 6
Sample Locations

Legend

- Soil Sample
- Site Boundary

Rail Classification

- Confirmed Class 1, Residential
- Confirmed Class 1, Rural
- Suspected Class 1, Rural
- Suspected Class 2, Rural

Notes:
Class 1=Rail line is beginning to deteriorate; no evidence of ties or they are broken down, some weathering of rail bed (visible rail bed topography exists at the site)
Class 2=Rail line is deteriorated; rail bed is discontinuous or has been weathered extensively
Confirmed=Visually inspected
H=height
Rural=land is agricultural or wooded with little or no exposure potential
Residential=land is near residential areas, but line is not considered residential
Suspected=Based on surrounding visually inspected locations
W=width

\\Gst-srv-01\HGLGIS\Cherokee_County_MSIW\RI
(3-07)Area_6_Locs.mxd
8/31/2015 JG
Source: HGL, ArcGIS Online USA Topo Map

HGL HydroGeoLogic, Inc.

APPENDIX B

TABLES

Table 1

COC Concentrations Expected to Provide Adequate Protection of Ecological Receptors

Habitat Type/Name	Exposure Medium	COC	Protective Level	Units	Basis[1]	Assessment Endpoint
Terrestrial	Soil	Lead	1,770	mg/kg	TRV	Terrestrial receptors (shrew, the American woodcock)
		Zinc	4,000	mg/kg	TRV	

Notes

[1] Provide Basis of Selection: Toxicity reference value (TRV) for lead is based on a study by Pankakoski et al. (1994) for mammals. TRV for zinc is based on a study by Kahn et al. (1993) for avians. TRVs were applied to specific receptors with assumed exposure scenarios of incidental ingestion.

Table 2

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Current
Medium: Soil
Exposure Medium: Soil

Exposure Point	Chemical of Concern	Concentration Detected		Units	Frequency of Detection	Exposure Point Concentration	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Soil On-site Direct Contact	Lead	7	16,533	ppm	26/34	400[1]	ppm	95% UCL
	Zinc	18	30,050	ppm	33/34	1,100[1]	ppm	95% UCL

Key
[1]Ecological cleanup levels developed from ecological preliminary remediation goals (PRGs) previously developed for the Site (EPA, 2006).

ppm: parts per million
95% UCL: 95% Upper Confidence Limit

Table 3

Ecological Exposure Pathways of Concern

Exposure Medium	Sensitive Environment Flag (Y or N)	Receptor	Endangered/Threatened Species Flag (Y or N)	Exposure Routes	Assessment Endpoints	Measurement Endpoints
Soil	N	Terrestrial vertebrates	Y	Ingestion and direct contact with metals in soils	Survival of terrestrial vertebrates	Toxicity of soils to short-tailed shrew and American woodcock
Mine Waste	N	Terrestrial vertebrates	Y	Ingestion and direct contact with metals in mine waste	Survival of terrestrial vertebrates	Toxicity of soils to short-tailed shrew and American woodcock

APPENDIX C

DETAILED COST ESTIMATE FOR ALTERNATIVE 3

Site: Cherokee County Superfund Site OU8
Location: Cherokee County, Kansas
Phase: Feasibility Study
Base Year: 2016
Date: 5/6/2016

Description: **Capital Costs for Alternative 3**

Unit costs are based on the most recent costing efforts for RA at Cherokee County OUs 3 and 4 unless noted below.

Item	Description	Estimated Quantity	Unit of Measure	Unit Cost	Project Cost	Notes
01 - Initial Activities					**$205,855**	
01	Prepare Work Plans & Permits/Mobilization	1		$40,000.00	$40,000	
02	Temporary Fencing	2,000	LF	$4.07	$8,140	Resued as needed for higher traffic areas.
03	Temporary Access/Haul Road Improvements	64	LS	$1,500	$96,000	
04	XRF Grid Survey	12,343	EA	$5.00	$61,715	Covers technician and XRF rental; assume 20 shots/hour. To determine lateral extent.
02 - Site Preparation					**$203,445**	
05	Construction Survey and Staking	2	DY	$1,104	$2,207	
	Temporary Erosion and Sediment Control - Pre-Construction					
06	Stabilized Construction Entrance	2	EA	$1,500	$3,000	
07	Silt Fence	10,000	LF	$1.42	$14,200	
08	Straw Bales	5,800	EA	$5.00	$29,000	Assume 100 bales/mile to address minor drainages and road ditches
09	Clearing and Grubbing	180.0	AC	$835.01	$150,302	Assumed 25' work area along line would need clearing and grubbing
	Demolition					
10	Barbed Wire Fence Demolition	3,200	LF	$1.48	$4,736	Assumed at least two per access area @ 25' width, no fences running along former rail bed
04 - Earthwork					**$4,274,496**	
	Mine Waste and Contaminated Soil					
11	Excavation, Hauling, and Placement - On Site Consolidation		BCY	$7.39	$0	
12	Excavation, Hauling, and Placement - Consolidation Area <10 miles	113,500	BCY	$8.41	$954,535	Assumed 35% of total volume and dozer work at consolidation area. R.S. Mean - 2 CY Excavotor, 18 CY Haul Truck, D10 Bulldozer.
13	Excavation, Hauling, and Placement -Consolidation Area 10 to 30 miles	210,700	BCY	$15.23	$3,208,961	Assumed 65% of total volume and dozer work at consolidation area. R.S. Mean - 2 CY Excavotor, 18 CY Haul Truck, D10 Bulldozer.
14	XRF Confirmation Sampling	18,500	EA	$6.00	$111,000	Assume on a 50' spacing along centerlineand on each side of rail bed
05 - Restoration					**$5,334,440**	
	Import and Place Soil from Off-Site Borrow Sources					
	General Restoration					
15	Select Fill	117,676	ECY	$21.65	$2,547,688	Estimated volume needed to bring the excavations back flush with the ground surface.
16	Top Soil	68,042	ECY	$30.28	$2,060,307	
	Mine Waste Consolidation Area					
17	Select Fill		ECY	$20.30	$0	Assume the OU3 or OU4 consolidation areas can receive the OU8 material at no cost to the OU8 project.
18	Top Soil		ECY	$29.75	$0	
19	Finish Grading	142	AC	$1,123	$159,872	
20	Mine Waste Consolidation Area Boundary Monuments		EA	$158.89	$0	
	Seed/Fertilizer/Mulch					
21	Seed - Pasture	142	AC	$2,233	$317,975	
22	Seed - Native		AC	$2,814	$0	
23	Seed - Wetland		AC	$2,987	$0	
	Drainage Improvements					
24	Drainage Swale/Replace Roadway Ditch	4,135	LF	$17.36	$71,782	Assume 2% of project length requires ditch repairs or new drainage
25	Replace/Repair Access Gate	16	EA	$607.45	$9,719	Assume one quarter of the temporary access points require gate replacement
26	Replace/Repair Barbed Wire Fence	3,840	LF	$4.07	$15,629	Demo length plus 20%
27	Remove/Repair Temporary Access/Haul Road	13	LS	$1,500	$19,200	Assume 20% of the access points require removal or repair
	Temporary Erosion and Sediment Control - Post-Construction					
28	Silt Fence	10,000	LF	$1.42	$14,200	
29	Straw Bales	5,800	LF	$13.46	$78,068	
30	Straw Wattles		LF	$1.71	$0	
31	Inspection and Maintenance	1	LS	$40,000.00	$40,000	Walking inspection of all disturbed areas plus miscellaneous topsoil repair and seeding
				SubTotal:	**$10,018,236**	
32	Bid and Scope Contingency	35%	percent		**$3,506,382.44**	Scope contingency of 25% and Bid contingency of 10%
33	Project Management	5%	percent		**$676,230.90**	Based on EPA guidance.
34	Remedial Design	6%	percent		**$811,477.08**	Based on EPA guidance.
35	Construction Management	6%	percent		**$811,477.08**	Based on EPA guidance.
				Estimated Construction Total:	**$15,823,803**	

Notes:
AC: Acre; BCY: Bank Cubic Yard; DY: Day; EA: Each; ECY: Embankment Cubic Yard; LF: Linear Feet; LS: Lump Sum; SY: Square Yard

Site: Cherokee County Superfund Site OU8
Location: Cherokee County, Kansas
Phase: Feasibility Study
Base Year: 2016
Date: 5/6/2016

Description: **Annual O&M for Alternative 3**

Unit costs are based on the most recent costing efforts for RA at Cherokee County OUs 3 and 4 unless noted below.

Item	Description	Estimated Quantity	Unit of Measure	Unit cost	Project Cost	Notes
Cover Maintenance						
01	**Repair Eroded Areas**					
02	Excavation, Hauling, and Placement	140	ECY	$20.30	$2,842.00	
03	Revegetate Cover	1	acre	$2,233.18	$2,233.18	
04	Staff Engineer - annual inspection of LUCs	8	per hour	$109.48	$875.84	RACER 33220106
				Subtotal:	$5,951.02	
05	Bid and Scope contingency	20%	percent		$1,190.20	Bid and Scope contingency of 10% each.
06	Project Management	5%	percent		$142.10	Based on EPA Guidance.
07	Technical Support	6%	percent		$170.52	Based on EPA Guidance.
				Total O&M Cost	**$7,453.84**	

Site: Cherokee County Superfund Site OU8
Location: Cherokee County, Kansas
Phase: Feasibility Study
Base Year: 2016
Date: 5/6/2016

Description: **Periodic Costs for Alternative 3**

Item	Description	Estimated Quantity	Unit of Measure	Unit cost	Project Cost	Notes
5 Year Review, Reporting						
01	Staff Engineer	12	per hour	$109.48	$1,313.77	RACER 33220106
02	Project Engineer	4	per hour	$139.21	$556.85	RACER 33220105
03	Draftsman/CADD	6	per hour	$87.39	$524.36	RACER 33220115
04	Project Manager	2	per hour	$169.75	$339.50	RACER 33220102
				Subtotal:	$2,734.48	
05	Bid and Scope contingency	20%	percent		$546.90	Bid and Scope contingency of 10% each.
06	Project Management	5%	percent		$136.72	Based on EPA Guidance.
07	Technical Support	6%	percent		$164.07	Based on EPA Guidance.
				Total Periodic Costs	**$3,582.17**	

Site: Cherokee County Superfund Site OU8
Location: Cherokee County, Kansas
Phase: Feasibility Study
Base Year: 2016
Date: 5/6/2016

Description: **LUCs for Alternative 3**

Item	Description	Estimated Quantity	Unit of Measure	Unit cost	Project Cost	Notes
Implementation of LUCs						
01	3-man survey crew	2	per hour	$208.38	$448.73	
02	Staff Engineer	24	per hour	$115.99	$2,719.73	RACER 33220106
03	Project Engineer	8	per hour	$147.49	$1,152.78	RACER 33220105
04	Draftsman/CADD	13	per hour	$92.59	$1,175.99	RACER 33220115
05	Project Manager	4.8	per hour	$179.84	$843.38	RACER 33220102
					$6,340.60	
06	Contingency	35%	percent		$2,219.21	Scope Contingency of 25%. Bid Contingency of 10%
				Total Cost	**$8,559.82**	

APPENDIX D

RESPONSIVENESS SUMMARY

Responsiveness Summary
Railroads (OU 08)
Cherokee County Superfund site
Cherokee County, Kansas

This Responsiveness Summary has been prepared in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERLCA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Contingency Plan (NCP), 40 CFR 300.430(f). This document provides the U.S. Environmental Protection Agency's response to all significant comments received from the public on the Proposed Plan for the inactive rail lines of the Cherokee County Superfund site (Site) during the comment period.

The Responsiveness Summary consists of the following three components: an overview of the public process, stakeholder issues and the EPA responses, and technical and legal issues and the EPA responses. This document is provided to accompany the Record of Decision (ROD) and reflects input resulting from the public comment process.

Overview

The Proposed Plan and supporting documents included in the Administrative Record file were made available for public review and comment from August 13, 2016, to September 13, 2016. A public meeting was held at the Baxter Springs Community Center in Baxter Springs, Kansas, on August 13, 2016, with eighteen local residents and state and federal government officials in attendance. Questions and comments were received at the August 15, 2016 public meeting following the EPA's formal presentation. The full transcript of the public meeting is included in the Administrative Record. This Responsiveness Summary contains a summary of significant public comments and the EPA responses.

***Comment**: Stakeholder inquired about the proposed start of the planned remedy.*

Answer: First, the Preferred Alternative of the Proposed Plan is selected as the Selected Remedy in a Record of Decision. Following signature of the Record of Decision, the EPA Region 7 must present the Selected Remedy before a Prioritization Panel at the EPA Headquarters. Remedial actions are ranked by priority and selected for funding, if funds are available. Following selection for funding at the EPA Headquarters, the EPA Region 7 may continue the remedial process and initiate construction of the Selected Remedy through remedial action.

***Question**: Stakeholder posed the question of why the abandonment of the rail lines did not include the remediation and why a landowner cannot take action themselves.*

Answer: Official abandonment is conducted under the Surface Transportation Board. The EPA prioritizes issues on the Site. The EPA's recommendation is to not take action as it is under an EPA action at this point. The EPA will use its best efforts to address the inactive rail lines as soon as possible.

***Question**: Stakeholder inquired on the leaching and migration of the contaminants.*

Answer: Based on the investigation of the inactive rail lines, the contamination extends approximately fifty to one hundred feet laterally from the center line. EPA has done numerous studies throughout the Tri-State Mining District on how far metals migrate from a pile. The studies concluded that the metals do not migrate any farther than a couple of hundred feet, but typically it is much less than that.

***Question**: Stakeholder inquired on the drainage concerns related to the rail lines, as many of the inactive rail lines act as berms.*

Answer: The EPA would excavate all mine waste and contaminated soils that are a part of, or surrounding, the inactive rail lines, backfill with clean soil, grade the area to drain, and revegetate the area. Both erosion controls and grading to natural drainage are components to the remedial design of the planned action.

***Question**: Stakeholder inquired on how the EPA consults with landowners that adjoin the rail lines and the general outreach activities within the planning phase.*

Answer: EPA utilized the Cherokee County property ownership database to first locate and reach out to property owners. EPA acquires access agreements for any property prior to entering a property for any action which includes interaction with individual property owners. In the remedial design, additional and further discussions would occur between the EPA and individual property owners.

***Question**: Stakeholder inquired on the responsibility for any removed fence as part of the construction.*

Answer: EPA would replace any fence disturbed during the construction activities of the remedial action with like materials.

***Question**: Stakeholder inquired on the disposition of the trees and undergrowth in many of the areas surrounding inactive rail lines.*

Answer: EPA would remove the trees and vegetation as part of the construction activities to facilitate access to the inactive rail line and excavation of any mine waste and/or contaminated soil within the heavily vegetated areas. EPA does consult with the property owner prior and during construction to identify any areas of potential concern of the property owner.

***Question**: Stakeholder inquired on the possibility of future testing of the mine waste and soils.*

Answer: EPA would continue testing efforts to find the limits of contamination during the remedial design phase.

***Question**: Stakeholders inquired on the ownership of the right of way of the inactive rail lines.*

Answer: Ownership of property where unused rail lines exist is a matter of state law, the terms of the instruments by which the right of way was created, and the facts concerning the use of the property over the years. People interested in determining their rights should consult with their own legal counsel.

APPENDIX E

ARARS

Federal Chemical-Specific ARARs

A. ARARs	Citations	Description
Clean Water Act (CWA) of 1977	33 U.S.C. § 1251et seq. as amended in 1987	Implements a system to impose effluent limitations on, or otherwise prevent, discharges of pollutants into any waters of the United States from any point source. Will be applicable if discharges to streams, rivers, or lakes occur from a site.
Safe Drinking Water Act	National Primary Drinking Water Standards 40 C.F.R. Part 141 Subpart B and G	Establish maximum contaminant levels (MCLs), which are health based standards for public waters systems.
Safe Drinking Water Act	National Secondary Drinking Water Standards 40 C.F.R. Part 143	Establish secondary maximum contaminant levels (SMCLs) which are non-enforceable guidelines for public water systems to protect the aesthetic quality of the water. SMCLs may be relevant and appropriate if groundwater is used as a source of drinking water.
Safe Drinking Water Act	Maximum Contaminant Level Goals (MCLGs) 40 C.F.R. Part 141, Subpart F	Establishes non-enforceable drinking water quality goals. The goals are set to levels that produce no known or anticipated adverse health effects. The MCLGs include an adequate margin of safety.
B. To Be Considered		
EPA Revised Interim Soil-lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities and 1998 Clarification	Office of Solid Waste and Emergency Response (OSWER) Directive 9355.4-12, July 14, 1994, OSWER Directive 9200.4-27P, August 1988	Establishes screening levels for lead in soil for residential land use, describes development of site-specific preliminary remediation goals, and describes a plan for soil-lead cleanup at CERCLA sites. This guidance recommends using the EPA Integrated Exposure Uptake Biokinetic Model (IEUBK) on a site-specific basis to assist in developing cleanup goals.
EPA Strategy for Reducing Lead Exposures	EPA, February 21, 1991	Presents a strategy to reduce lead exposure, particularly to young children. The strategy was developed to reduce lead exposure to the greatest extent possible. Goals of the strategy are to 1) significantly reduce the incidence above 10 µg Pb/dL in children; and 2) reduce the amount of lead introduced into the environment.

Technical Impracticability Waiver in Groundwater ARARs, Cherokee County Superfund site	EPA, Region 7 Record of Decision for OU 03 and OU 04 of the Cherokee County site, August 1997.	This document established the technical impracticability (TI) of restoring the shallow groundwater aquifer in mined areas of the Cherokee County site. The TI waiver determined that aquifer restoration was impracticable based on the large size and heterogeneous nature of the aquifer, lack of effective pumping and treatment technology, and the inordinate costs associated with groundwater treatment.
Superfund Lead-Contaminated Residential Sites Handbook	EPA OSWER 9285.7-50, August 2003.	Handbook developed by EPA to promote a nationally consistent decision making process for assessing and managing risks associated with lead contaminated residential sites across the country.

State Chemical-Specific ARARs

A. ARARs	Citation	Description
Kansas Surface Water Quality Standards	K.A.R. 28-16-28b through 28-16-28g	Establishes water quality criteria in surface waters of the state to maintain and protect the existing uses of those surface waters. Will be relevant and appropriate at sites where surface waters of the state are affected.
Kansas Primary Drinking Water Regulations	K.A.R. 28-15a-11	Establishes maximum contaminant levels (MCLs) for inorganic chemicals that are health risk based standards for drinking water. Will be applicable at the distribution point (i.e., at the tap). Will be relevant and appropriate at sites where potential drinking water sources—rivers, lakes, reservoirs, springs, and ground water wells—are affected.
B. To Be Considered		
Screening Goals for Contaminants in Soil and Groundwater	Kansas Department of Health and Environment (KDHE), Bureau of Environmental Remediation (BER), Risk Based Standards for Kansas, RSK Manual - 5th Version, October 2010, Revised September 2015, as amended	Identifies risk-based cleanup screening goals for contaminants in soil and groundwater.

Federal Location-Specific ARARs

A. ARARs	Citation	Description
Site within an area where action may cause irreparable harm, loss, or destruction of artifacts.	Archeological and Historic Preservation Act; 16 U.S.C. 469, 40 C.F.R. 6.301.	Provides for the preservation of historical or archaeological data which might be destroyed or lost as the result of 1) flooding, building of access roads, relocation of railroads and highways, and other alterations of terrain caused by the construction of a dam by government or persons, or 2) alteration of terrain caused by Federal construction projects or federally licensed activity or program. Will be applicable if construction projects or alteration of terrain at a site have the potential to destroy historical or archaeological materials.
Historic project owned or controlled by a federal agency	National Historic Preservation Act: 16 U.S.C. 470, et.seq; 40 C.F.R. § 6.301; 36 C.F.R. Part 1.	Establishes a national registry of historic sites. Provides for preservation of historic or prehistoric resources. Will be applicable if a site is listed on historic registry and if activities requiring permitting are initiated at a site.
Site located in area of critical habitat upon which endangered or threatened species depend.	Endangered Species Act of 1973, 16 U.S.C. 1531-1543; 50 C.F.R. Parts 17; 40 C.F.R. 6.302. Federal Migratory Bird Act; 16 U.S.C. 703-712.	Provides a program for conservation of threatened and endangered plants and animals and the habitats in which they are found. Will be applicable if threatened or endangered species, or their habitats are present at or near a site.
Clean Water Act (CWA) of 1977 Wetlands Protection	40 CFR 22, 40 CFR 230 to 233, and 33 CFR 320 to 330	Allows for permitting of discharge of dredged or fill material to the waters of the United States if no practicable alternatives exists that are less damaging to the aquatic environment. Applicants must demonstrate that the impact to wetlands is minimized. Will be applicable if designated wetlands are affected by a remedy.
Site located within a floodplain soil.	Protection of Floodplains, Executive Order 11988; 40 C.F.R. Part 6.302, Appendix A.	Requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Will be applicable if a site is located on a designated flood plain.

A. ARARs	Citation	Description
Wetlands located in and around the soil repository.	Protection of Wetlands; Executive Order 11990; 40 C.F.R. Part 6, Appendix A.	Requires federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative. Will be applicable if designated wetlands are affected by a remedy.
Fish and Wildlife Conservation Act	Fish and Wildlife Conservation Act of 1980, 16 U.S.C. Part 2901 et seq.; 50 C.F.R. Part 83.9 and 16 U.S.C. Part 661, et seq. Federal Migratory Bird Act, 16 U.S.C. Part 703.	Action to conserve fish and wildlife, particularly those species that are indigenous to the state. Will be applicable if significant populations are present at a site or they are affected by site activities.
Fish and Wildlife Coordination Act	16 U.S.C Section 661 et seq.; 33 C.F.R Parts 320-330; 40 C.F.R 6.302	Requires consultation when a Federal department or agency proposes or authorizes any modification of any stream or other water body, and adequate provision for protection of fish and wildlife resources.
Historic Site, Buildings, and Antiquities Act	16 USC Section 470 et seq., 40 CFR Sect. 6.301(a), and 36 CRF, Part1.	Requires Federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks and to avoid undesirable impacts on such landmarks.
Clean Air Act	National Ambient Air Quality Standards/ NESHAPS 42 U.S.C. 74112; 40 C.F.R. 50.6 and 50.12	Emissions standards for particular matter and lead.
Rivers and Harbors Appropriation Act of 1899	33 U.S.C. 401; 33 U.S.C. 403; and related regulations 33 C.F.R. 320	Prohibits building of structures (Section 9) and the disposal of dredged and fill material into waters of the U.S. without a permit by a designated federal agency. Will be applicable if structures are constructed or a discharge of dredged or fill material occurs in waters of the U.S.

A. ARARs	Citation	Description
100-year floodplain	Location Standard for Hazardous Waste Facilities-RCRA; 42 U.S.C. 6901; 40 C.F.R. 264.18(b).	RCRA hazardous waste treatment and disposal. Facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout during any 100-year/24 hour flood.
B. To Be Considered	None	

State Location-Specific ARARs

A. ARARs	Citation	Description
Water Structures and Stream Obstructions and The Levee Law	K.S.A. 82a-301 through 82a-328; K.A.R. 5-40 through 5-46; K.S.A. 24-105 and K.S.A. 24-126; K.A.R. 5-45-1 through 5-45-23	Requires the Division of Water Resources to permit certain actions including dam construction or modification, stream obstruction construction, stream channel modification, levee construction, and floodplain fill. Will be applicable for any action requiring dam construction or modification, stream obstruction, channel modification, levee construction, or floodplain fill.
Kansas Historic Preservation Act	K.A.R. 118-3-1 to 118-3-16	Provides for the protection and preservation of sites and buildings listed on state or federal historic registries. Will be applicable if a site or building is listed on the state or federal historic registry and if activities requiring permitting are initiated at a site.
Nongame and Endangered Species Conservation Act of 1975	K.S.A. 32-957 through 32-963, 32-1009 through 32-1012, 32-1033 and K.S.A. 32-960a and 32-960b, and amendments thereto	Places the responsibility for identifying and undertaking appropriate conservation measures for listed species directly upon the Department of Wildlife, Parks and Tourism. Regulations require the department to issue special action permits for activities that affect species listed as threatened and endangered in Kansas. Will be applicable if state-listed threatened or endangered species, or their habitats are present at or near a site.
B. To Be Considered	None	

Federal Action-Specific ARARs

A. ARARs	Citation	Description
National Pollutant Discharge Elimination System (NPDES)	40 C.F.R. Part 122.26; 33 U.S.C 402 (p)	Regulates discharges of pollutants from any point source into waters of the United States. Will be applicable if water from the site will be discharged onto land or into streams, rivers or lakes.
Storm Water Discharge Requirements NPDES	40 CFR 122.26	Provide requirements to obtain a permit to discharge to the storm water sewer system under the NPDES program. Will be applicable if the site has storm water that comes in contact with construction or industrial activity or if the selected remedy involves discharge of treated water to surface waters.
Federal Water Quality Standards	40 CFR 131	Establishes non-enforceable standards to protect aquatic life.
National Ambient Air Quality Standards (NAAQS)	42 U.S.C. 74112; 40 C.F.R. 50.6 and 50.12	Emissions standards for particular matter and lead.
Resource Conservation and Recovery Act (RCRA), Subtitle D, Solid Waste Regulations	42 USC Sec. 6941 40 CFR Part 257, Criteria for Classification of Solid Waste Disposal Facilities and Practices	This section of the RCRA regulations requires the closure of existing solid waste facilities, design of new landfills, and disposal of solid wastes to be in accordance with various standards and criteria. These standards are applicable to solid waste disposal facilities, including mining and mill waste facilities. Among other things, these regulations require that facilities be maintained to prevent wash out of solid wastes and that the public not be allowed uncontrolled access.
Surface Mining Control and Reclamation Act (SMCRA)	30 USC Sees. 1201-1328 30 CFR Part 816	SMCRA regulations govern coal exploration and active coal mining. Hence, these regulations are not applicable to remedial actions taken at the Cherokee County Site. Nevertheless, some of the surface mining standards found in 30 CFR Part 816 are relevant and appropriate requirements because they address circumstances that are similar to those found at the Cherokee County Site. The relevant and appropriate requirements include Part 816.45, Sediment Control Measures; Part 816.46, Siltation Structures; Part 816.102, Grading Requirements; and Part 816.111, Revegetation.

DOT Hazardous Materials Transportation Regulations	49 CFR Parts 107, 171-177	Regulates transportation of hazardous materials. Would be relevant and appropriate for the transport of excavated materials within the Site.
B. To Be Considered		
RCRA, Subtitle C, Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities	RCRA Section 3001 et seq. 42 USC Sec. 6921, et seq. 40 CFR Part 264.522, Disposal Of Hazardous Wastes In Designated Corrective Action Management Units (CAMUs). 40 CFS Part 264.554(D)(1)(i) and (ii) Staging Piles	The section defines Corrective Action Management Units (CAMUs) to be used in implementing corrective actions at Superfund Sites. A CAMU is defined as a disposal site used for consolidation or placement of remediation wastes within the contaminated areas of the site. Under these regulations, placement of wastes in a CAMU does not constitute land disposal of hazardous waste and does not constitute creation of a unit subject to the RCRA land disposal restrictions and minimum technology requirements (40 CFR Part 268). This Section of RCRA is not an ARAR because of the Beville exclusion, but certain substantive requirements related to design, operation and closure of disposal sites should be considered.
RCRA, Subtitle C, Identification and Listing of Hazardous Wastes	RCRA Section 3001(b)(3)(A)(iii), Beville exclusion of mineral extraction and beneficiation wastes. 40 CFR Part 264.2, Definition of solid waste and 40 CFR Part 261.4 (b) (7)	Mill waste within the Site is specifically excluded from regulation as hazardous wastes under the Beville exclusion because they are wastes resulting from mineral extraction and beneficiation. Therefore, the RCRA Subtitle C regulations are not ARARs.
Toxic Substances Control Act – Strategy for Reducing Lead Exposures	EPA, February 21, 1991	Presents strategies for reducing lead exposures by reducing the amount of lead in the environment, as well as reducing blood lead levels, especially in children.
EPA Mine Waste	EPA Region 7 Fact Sheet, February 2003	Provides public guidance on mine waste usage in the states of Missouri and Kansas. Provides a list of uses for mine waste that is not likely to present a threat to human health and the environment.

State Action-Specific ARARs

A. ARARs	Citation	Description
Mined Land Reclamation	K.A.R. 47-16-1 to 47-16-11	Allows for the reclamation of mined land and associated waters. Will be applicable if mined land or associated waters are to be reclaimed.
Environmental Use Controls	K.S.A. 65-1,221 to 65-1,235	An environmental use control "means an institutional control or administrative control, a restriction, prohibition or control of one or more uses of, or activities on, a specific property, as requested by the property owner at the time of issuance, to ensure future protection of public health and the environment when environmental contamination which exceeds department standards for unrestricted use remains on the property following the appropriate assessment and/or remedial activities as directed by the department pursuant to the secretary's authority". These restrictions are strictly voluntary as the landowner applies for the restriction to their property to mitigate the risk posed to human health and the environment from contamination at their property (in lieu of active remediation).
Hazardous Waste Management Standards and Regulations	K.S.A. 65-3430 et seq., as amended; K.A.R. 28-31-4 et seq., as amended	Identifies the characteristics and listing of hazardous waste. Prohibits underground burial of hazardous waste except as granted by EPA or KDHE. Establishes restrictions on land disposal. Establishes standards for generators or transporters of hazardous waste. Establishes standards for hazardous waste storage, treatment and disposal facilities. Will be applicable if hazardous wastes are present at a site.
Kansas Board of Technical Professions	K.A.R. 66-6-1 through 66-14-12	Establishes the requirements for licensing of engineers, land surveyors, geologists, and architects. Will be applicable if the services of a geologist, engineer or land surveyor are required for site investigations or remediation.

Spill Reporting	K.A.R. 28-48-1 to 28-48-2	Requires reporting of unpermitted discharges or accidental spills. Requires that containment and immediate environmental response measures be implemented. Also provides for technical assistance for mercury-related spills. Will be applicable if unpermitted discharges or accidental spills occur at a site.
B. To Be Considered		